POPULAR
Computing
WEEKLY

Only 40p.

7 – 13 March 1985

It's the best selling weekly

Vol 4 No 10

Soft famine aid

SOFT AID, the computing equivalent of the music industrie's Ethiopian famine relief appeal is now available.

Proceeds from sales of the cassette – a compilation of games from top software houses – will go to the Bob Geldof Band Aid Ethiopian Appeal Fund.

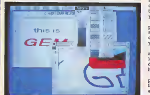
The tape is being sold from most major retail outlets. "We would hope to sell over 20,000 units each for Spectrum and Commodore 64," said Rod Cousens, of Quicksilva, who organised the Soft Aid appeal. "I hope that'll turn out to be a conservative estimate. All the proceeds from sales are going to Bob Geldof's appeal through the Band Aid trust and I'm confident that all the proceeds will reach the famine victims directly."

The tape which has been produced for the Spectrum and Commodore 64, contains the following game titles. Commodore: *Gumshoe* (A'n'F), *Beam Rider* (Activision), *Star Trader* (Bug Byte), *Gyropod* (Taskset), *China Miner* (Interceptor), *Kokotoni Wilf* (Elite), *Gilligan's Gold* (Ocean), *Fred* (Quicksilva), *Falcon Patrol* (Virgin) and *Flak* (US Gold). Spectrum: *Ant Attack*

Continued on page 4 ▶

Is Sinclair's Spectrum + up-grade kit worth £20? Find out p13

PRICELESS GEM? – p14



Acorn indicates new direction

ACORN has denied reports that it is to pull out of the home computer market, although production of its Electron is unlikely to be restarted for the foreseeable future.

Dr Alexander Reid, Acorn's new chairman and acting chief executive, following the Olivetti rescue a fortnight ago (see *Popular Computing Weekly*, February 28), said: "We will be continuing to sell the Electron this year and hopefully next year as well.

"Whether we will go into production on the Electron again or not will depend on our sales level during the year."

The company now plans also to sell the Electron in at least two special packs, bundling the machine with extra hardware and software.

One package contains the processor and Plus 1 interface with joysticks, software and introductory books aimed at the games player.

A second consists of the micro and Plus 3 add-on, which comprises the disc interface and disc drives for the more serious user.

"We feel we have a very strong presence at the top end of the home market with the BBC and Electron micros – £129 for the Electron is a very good price," added Alexander Reid.

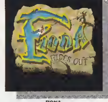
Dr Alexander Reid

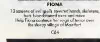
Continued on page 4 ▶

INSIDE ❯ AMSTRAD COMPO ❯ GHOSTBUSTERS INTERVIEW ❯

A New Breed

Challenging software from Viper





FIONA

13 screens of evil spells severed hands, skeletons, bats bloodstained axes and more
Help Fiona continue her reign of terror over the sleepy village of Montfort

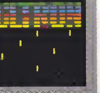
C64



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18 Levels of dangerous flying over enemy territory!
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Smooth scrolling all action arcade game.

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BBC



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Vol 4 No 10

POPULAR Computing WEEKLY

View

Software conversions – are they worth it?

These days most new computer titles are produced on more than one machine – US Gold, for example last week announced an ambitious programme of conversions of its American Commodore 64 titles to the Spectrum.

The logic as far as the software house is concerned is obvious Once it has established a top selling program on one machine, versions on other machines will sell off the back of the hit title alone

The big snag with conversions, though, is that, since different machines have different strengths and weaknesses, the conversions are, therefore, not always as good as the original.

This is particularly true with arcade titles Very often they are written to stretch the micro to its limits of graphics and speed. Take that title across to another machine and it may just not be possible to achieve the same kind of effects Imagine, for example, the difficulties of converting *Knight Lore* or Firebird's *Gyron* for the Commodore 64 – it wouldn't be easy An example of the converse would be *Ghostbusters* great on the 64, rather muted on the Spectrum. *Elite* on the 64 is a faithful conversion from the BBC, but it runs a good deal slower Often, too, the new versions are written by different authors, which doesn't help

Although there are exceptions (Virgin's *Sorcery* conversion from the C64 to the Amstrad), programs are nearly always more successful on the machines for which they were first written.

The original is nearly always the best.

Presents...

Futures...

Computers in control – Build your own robot for under £20 . . . a detailed look at the Zero 2

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ABC

58 052 copies sold every week (Jan-June 1984 ABC)

How to submit articles Articles which are submitted for publication should not be more than 2000 words long The articles and any accompanying programs should be original It is breaking the law of copyright to copy programs out of other magazines and submit them here — so please do not be tempted **Accuracy** *Popular Computing Weekly* cannot accept any responsibility for any errors in programs we publish, although we will always try our best to make sure programs work.

Computer Trade Association Magazine of the Year

50 products at QL show

SINCLAIR's QL exhibition drew 24 companies to the London Hilton last week to demonstrate around 50 new software and hardware products.

Most of the software announced comprised utility products – Computer One's *QL Pascal*, *QL Forth*, *QL Monitor*, *QL Assembler* and *QL Typing Tutor*, for example. Metacomco also had a wide range of utilities: *Assembler Development Kit*, *BCPL Development Kit* and a *LISP Development Kit*. Adder Publishing also entered this field with *QL Toolkit* and *Debugger*.

Graphics packages were also very popular. Talent showed its *Graphic QL* product (£34.95) which is based on *Panorama(H)*, Talent's hi-res graphics program for the Commodore 64. The facilities on *GraphicQL* include free-hand drawing, a user-definable paintbrush of any width or colour option, re-colouring, airbrush effects, magnification, and a printer dump facility. Text can be used with pictures, and the graphics incorporated in the user's own programs. Talent is also planning a microdrive cartridge Doctor package at £21.95, which will enable the user to retrieve data from corrupted cartridges.

Eidersoft showed a number of graphics products. *QL Art* is a suite of five programs – *Artist* gives a cursor-controlled drawing board, enlargement and reduction of pictures, and hi-res printer dumps. *Calligrapher* allows the user to design their own character set, *Windo* creates windows on-screen, *Logo Graphics* gives turtle graphics facilities, and *File Manager* allows you to manipulate graphics files easily. *QL Art* costs £14.95.

Games, however, were thin on the ground. Talent showed *West* and *Zkul*, the two text adventures launched before Christmas and Psion's *Chess* package was also demonstrated. CP Software launched a conversion of its *Bridge Player* program at £18.95. CP's next QL release will be *Backgammon*.

Sagesoft's *QL Accounts* program, Accounting Software's *Cash Trader*, and Triptych's *Project Planner*, *Entrepreneur*, and *Decision Maker*, all announced at January's Which Computer? Show, were all on show.

On the peripherals side, disc drives were shown from a variety of companies – Micro Peripherals, Medic Data Systems, CST and Quest. Micro Peripherals also showed a laser printer.

● A new company, Digital Precision, which did not attend Sinclair's exhibition, has also announced a number of software packages for the QL, including a sprite generator.

QL Super Sprite Generator allows 18 different sprites to be on-screen simultaneously, each sprite can have up to 16 different shapes to simulate motion, and 256 different planes to simulate depth. Collision detection is automatic. The user controls and develops the sprites using keywords from within SuperBasic. The program compiles the instructions into machine-code automatically. The package costs £19.95.

Digital Precision has also launched *QL Super Backgammon* at £15.95, and *QL Super Monitor* at £16.95. Details from Digital Precision, 91, Manor Road, London E7.

Avalon's sequel out soon

DRAGONTORC of Avalon is the latest release from Hewson Consultants, the sequel to *Avalon*.

The game, released for the Spectrum, shows the same graphic techniques as its predecessor, but Hewson has included a feature it calls sensory animation, whereby the main character interacts with others, such as elves and goblins, to manipulate them and win them over.

The plot involves preventing Morag, the Witch Queen of the North, from using the powerful Dragontorc to achieve her evil ambitions. As with *Avalon*, the characters are joystick-controlled.

Dragontorc costs £7.95, and will be available by the end of this month.

Soft Aid

◄ continued from page 1

(Quicksilva), *Sorcery* (Virgin), *Kokotoni Wilf* (Elite) *Horace Goes Skiing* (Melbourne House), *Spellbound* (Beyond), *Star Bike* (The Edge), *The Pyramid* (Fantasy), *Gilligan's Gold* (Ocean), *3D Tank Duel* (Realtime), and *Jack and the Beanstalk* (Thor). The hit song *Do They Know It's Christmas*, by Band Aid, is also featured on both sides of the tape.

Software houses, those involved with production duplication and distributors have agreed to waive their normal profit margins on the cassette.

Soft Aid costs £4.95 for both Spectrum and Commodore 64 versions.

● Units sold in W H Smith's chain of stores will have a 'flash' sticker added to the cassette front. W H Smith expressed reservations over the cover picture of *Soft Aid*, and requested that the fact that proceeds were going towards famine relief should be mentioned on the cover before they would sell it. A suitable sticker has now been printed, and *Soft Aid* should be available in W H Smith's shops by the end of this week.

US Gold's catalogue expands

US GOLD has announced its new releases for this spring and summer. Among them are conversions for Spectrum, Amstrad, BBC and MSX, and the first products in its 'Famous Faces' and 'All American Adventures' series.

The only 'Famous Face' signed up so far is Conan, from the film *Conan the Barbarian*, which should be available this week for Commodore 64 and Atari on disc at £14.95. Conversions to other machines are expected.

continued on page 5 ►

Acorn's new direction

◄ continued from page 1

He also confirmed that Acorn's consumer division would be producing further micros under the BBC label. "We will be bringing out improved versions of the BBC this year." However, he declined to say whether these would be modifications to the existing Model B, or a new machine.

Acorn's ABC range is also being redefined in terms of its target market. Production of the machines now comes under the company's Scientific and Industrial branch. "There will be a change of tack with the ABCs, as they will not be aimed at the general business market. We are looking closely at the eight models which currently make up the series, some may be changed, and some new ones may be added."

On the business side, Acorn is to act as an original equipment manufacturer for other companies. "The Communicator will become a major focal point of Acorn's range. The advanced computer project being developed in Palo Alto for 1986-87 is also included here."

Dr Reid stressed that his role as acting chief executive with Acorn was temporary. Acorn is hoping to appoint a new permanent managing director as soon as possible.

Network suppliers buy Prism modems

PRISM S range of Viewdata products is now available again from a company named Modem House.

Modem House has bought existing stocks of the Prism VTX1000 and 2000 modems and has undertaken to fully support the Prism label, following Prism's financial collapse last month (see *Popular Computing Weekly*, February 7).

"We will be selling the modems at special offer prices for about twelve weeks to begin with," explained Keith Rose, Modem House's marketing director "The VTX 5000 will start off at £49 95 and that price includes a free quarterly subscription to Micronet 800 and Viewfax

"The Modem 1000 will cost £59.95 and the Modem 2000 £69.95, again as special offer prices When stocks are cleared we hope to continue production if OE, the manufacturers, are receptive "

Modem House's main field of business is supplying network and viewdata packages for business use This move marks its entry into the home market.

Details on the Prism range from Modem House, Iolanthe Drive, Exeter, Devon, EX4 9EA (0392 69295).

US Gold

◄ continued from page 4

The 'All American Adventures' will be in the shops later, mid to late-April for the first title, *Exodus, Ultima III*, and early May for *Wizard* and *the Princess*

"This is a much bigger version of *Wizard and the Princess* than the one brought out by Melbourne House for the Vic 20,' said Tim Chaney of US Gold

Included in the Spectrum conversions are *Solo Flight*, *Raid over Moscow*, *Bruce Lee* and *Beachhead II* *Beachhead I and II*, *Raid over Moscow* and *Bruce Lee* are also now available for the Amstrad CPC 464 Four titles, *Grogs Revenge*, *Whirlynurds*, *Bounty Bob Strikes Back* and *Dambusters* are to be converted to Spectrum, CPC 464, BBC and MSX.

● US Gold is currently in dispute with GB Gold, a software company set up by Preston-based distributors Vanguard Leisure

Apart from the similarity in the names of the two companies, US Gold is claiming that the logo and lettering used by GB Gold is very similar to its own

"US Gold is objecting to us using the name GB Gold," said Brian Simpson who heads Vanguard's software venture "We don't see that we're doing anything drastically wrong – when we thought of the name, the idea was to complement US Gold, but promoting original British software

A preliminary hearing was due to be held in court earlier this week

Ram extension launched for C16

A NORWICH-based company, Micro Component Trading, has produced a 64K Ram extension for the C16 The company claims that the extra Ram will ensure that any software designed specifically for the Plus/4 will run on the modified C16

"The extension fits inside the computer " explained Dave Viner of Micro Component Trading "All you have to do is remove one chip from inside, insert the board, and replace the chip This also leaves the cartridge port free " However, he was not sure how this operation would affect the guarantee on the computer

The Ram expansion – which costs £59.95 – will leave around 60.5K free to Basic in text mode and a little more than 48K free in high-res graphics mode

Details from Micro Component Trading, Group House, Fishers Lane, Norwich, NR2 1ET (0603 666966).


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SPECTRUM

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The famous Quickshot II is the top games joystick, with a sleek trigger fire button for quick reactions, an auto fire switch for continuous shooting and a new, improved grip. Revolutionary built-in stabilising suction cups mean a sure, firm grip – a snip at £9.95.

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If you've a 16K Spectrum micro, this handy and inexpensive add-in kit boosts the RAM memory to a powerful 48K, so you can run the latest and greatest software, the most exciting games around – and expand your own programming possibilities! Only £21.95.

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Tom Hussey
POPULAR Computing WEEKLY
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HIT!
The Bungeling Empire is out to destroy civilisation as we know it.
DON'T WAIT — GET YOUR COPY NOW!
ariolasoft

Serious limitation

I have discovered a serious limitation with the 'coercion' facility on the QL.

While trying to copy the graph program in the Spectrum manual I came upon a problem with the difference between the *Val* command and 'coercion'.

The examples below illustrate what I mean.

On the Spectrum.

```
10 LET A$ = "54*34/10"
20 LET A = VALA$
30 PRINT A
```

gives the value of 183 6.

The equivalent program in SuperBasic should be

```
10 LET A$ = "54*34/10"
20 LET A = A$
30 PRINT A
```

The snag is that when *Run* it gives a value of 54.

The QL appears only to accept numbers in string expressions and not operators or functions as *Val* does.

Does anyone know if there is any way on the QL of inputting a function as a string and then converting it into a normal variable?

D Walker
30 Rennishaw Way
Links View
Northampton NN2 7NE

Correct information

As the authors of the Psion's Spectrum Chess title, we were naturally interested in P. Mellor's problem with the program (February 14 issue).

Upon investigation, it would appear that when setting up the board he indicated that his Pawn had not previously moved, when in fact it had. If the correct information is supplied to the computer, the program responds with an entirely different move.

Andy Lawrie
Technical Director
Mikro-Gen
23a Station Road
Ashford
Middx

Illegal move

I was interested to read of P Mellor's Psion *Chess* problem.

During a game of Psion *Chess* on a ZX81, the machine moved a knight to where it could be taken by a diagonal move from a pawn, which had not been previously moved. When I tried to capture the knight, the program rejected the move as illegal.

Walter Murray
58 Norfolk Road
Upminster
Essex

Load of rubbish

Andy Lawrie of Mikro-Gen (letter, February 21) is, I think, a QL basher. The 68000 is the best microprocessor on the market and the QL is only the start of the 68000 micros.

As for learning a new processor in two days – what a load of rubbish! You cannot learn any new chip in two days – no way. Is Mr Lawrie an Alien (8)!

Chris Powell
16 Edward Street
Oswestry
Shropshire

Money thrown away

I have been waiting since the arrival of *Underwurlde* and *Knight Lore* for Ultimate to release its next Spectrum title *Alien 8*.

When it was released today I bought it immediately and now I feel that I have thrown my money away. The game is a direct copy – except for the redefined graphics – of *Knight Lore*. It seems Ultimate has fallen into the 'let's copy our successful game' trap and Spectrum owners must suffer for it.

David McFadyen
38 Longford Court
Bell Lane
London NW4 2BU

Italian rumour

Is there any truth in the rumour that the Anglo/Italian company responsible for the BBC micro and the Electron is to be renamed Acornetto?

Ian Martin
10 Taranto Hill
Ilchester
Yeovil
Somerset

Program transfer

I wish to correct your editorial piece which stated that my *Specnet* software could turn a VTX 5000, 1200/75 baud modem into a 300 baud version.

This is not possible due to the modem chip used.

Our software does, however, allow you to use 1200/75 Bulletin boards (such as the one run by the Open University for its students) and the program displays at least three numbers of such boards.

They do not, however, use Prestel, so that is why the new software is required.

The program also provides program transfer with error checking to and from the board, plus, all control characters can be sent. The results can be sent to microdrive or tape and screenful's can be dumped to a ZX printer.

Stephen Adams
1 Leewin Road
London N18 7NL

Woefully lacking

Having just read *Ziggurat* column in the February 14 edition, I am writing to say that Mike Grace is not alone in his problems with Act documentation.

Like you, I recently upgraded from a humble Spectrum to an Act as it appeared to me (and still does) to be the best machine on the market in the 16-bit processor field. Also like you, however, I was very disappointed by the general level of information given in the literature accompanying the computer.

Information as to how the discs supplied were to be used and what various things did was, unfortunately, woefully lacking.

The reason for these shortcomings is presumably that the manufacturers assume that their computers will only be used by people with no interest in taking advantage of two thirds of the facilities, and will only wish to run packages. Even the method of using *Setup* to change the default settings of the machine is not properly explained.

Unlike the more widely used machines, no one seems to have brought out an idiot's guide to the Apricot. A shame really as these are the generation of machines that enthusiasts are moving towards.

I am about to start using my machine with a modem so that I can go looking in the bulletin boards for other Apricot users.

Clive Sillenness
131 Hicks Avenue
Greenford
Middx

Below the buffer

With regard to B G Young's enquiry in *Peek & Poke* (January 17 issue) who found problems with programs running when the Currah speech unit is connected – I may have the answer.

The Currah Microspeech sets up a buffer at the top 256 bytes of Ram when connected. If you have a program written in machine-code with bytes at the top of Ram it overwrites and the program crashes.

Consequently, any machine-code must be located below the buffer that Microspeech uses – either that or the Currah unit must be disconnected.

John Durst
Swerford
Oxon

The bank buster

Christina Erskine talks to David Crane of Activision

With *Ghostbusters* continuing to top the charts on both its Commodore 64 and Spectrum editions, its designer and writer David Crane slipped into this country for a couple of days during the LET Show David commands the sort of status in the US that Jeff Minter and Matthew Smith do over here, he has carved out a selective kind of fame for himself and his creations

While Commodore 64 users will probably know David as the author of *Ghostbusters*, – primarily – *Pitfall* and *Decathlon*, David actually has around ten titles under his belt, and was a founder member of Activision five years ago

I went to see David at Activision's London headquarters – the offices are pretty spacious, but David, at six foot, managed to make them look quite pokey Somehow he just doesn't look like what a computer programmer is supposed to look like How'd it happen?

"I was always very keen on electronics at High School in Indiana – I took lots of extra courses in computing and electronics, so I could program fluently in three different languages by the time I left It really started when I designed a tic tac toe playing computer when I was about thirteen " Tick-tac-toe, incidentally, is American for Noughts and Crosses

After college David worked for an electronics firm, designing microchips A friend, who was developing video games for Atari, tried to convince David that this was what he should be doing

"I was suspicious of the idea, because all that programming involved didn't appeal But then I thought, well, games designing sounds like fun, so I took the job

"Now people tend to be quite envious when I tell them I play and write games for a living Especially, when I tell them that I judge how well I've done on the game, by how much I enjoy playing it "

After two years with Atari, David helped start up Activision, and continued writing a number of games for the Atari VCS system – *Dragster*, *Laser Blast* *Grand Prix* among them

"I usually spend about eight months writing a program, and about half of that time is spent on the finishing touches and debugging. But with such a long development time, it means I have to look ahead to what will be innovative in a year's time.

"For instance when everyone was bringing out space attack games – and I've written quite a few of those – I would have to look elsewhere for my next idea because by the time it was finished space games would be out of fashion. I've now programmed just about every type of game – except adventures But racing games, driving games, space games, arcade strategy, yes The other constraint I have is that I'll never do two of the same format in a row, or I get bored with the repetition "

With *Ghostbusters*, however, David broke several of his previous traditions

"For a start, I was told I had six weeks to do the game I said there were was no way I could do an entire game in six weeks, so for the first time, we involved other people in the project and it became a team effort Usually at Activision, a project is one person's from start to finish. However, the team idea worked so well on *Ghostbusters* that I reckon we'll do that for all the future programs "

Part of *Ghostbusters* is in fact a quite different game David was working on before he took on the project.

"Before the movie came out, I had been playing around on screen with an idea for a game I had a car, viewed from above, travelling through various streets, and a screen whereby you could load the car with weapons with a fork-lift truck I thought maybe the weapons could be used against various baddies the car came across in the streets

"Unbeknownst to me, Activision was talking to Columbia Pictures about *Ghostbusters* even then

"When I was told Activision was going to do the *Ghostbusters* game, and that it had to be done in six weeks, I was lucky I'd just seen the movie, and I realised straight away that I should be able to work my car in the streets screens to fit into the game somewhere I went to see the movie again the night I was asked, and then it was head down to get it worked out from then on

"I sat down with the *Ghostbusters* brief, and got the gist of the game defined on the first day Firstly I had some useful screens, secondly I had to construct something similar to the movie and using features from it, I had to add some comic overtones to tie in with the humour of the movie, and I wanted to design something that would stand up on its own, with or without the movie tie-up

"I tried to get the humour in with things like the ghost vacuums and marshmallow sensors

I wanted to use the movie's theme music to run through the game, which wasn't too difficult Then I felt that if we could include the lyrics from Ray Parker Jnr's hit, it would add another fun element to the program, and that's where the bouncing ball came in.

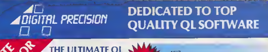
The speech synthesis, however, is not David's, but done by a separate company, Electronic Speech Systems, based in Berkeley in California "Again, the main reason we used it was that it was another aspect of the fun in the game, also we felt it was valuable in order to demonstrate that you can implement that quality of speech in a computer game "

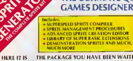
So how does David intend to follow an act like *Ghostbusters*? "I honestly don't know at the moment – I haven't got a game in development at present I'm trying to promote this team format we used for *Ghostbusters* within Activision, so that we can do it on future releases Whatever I do next, it'll be another product in the entertainment software field, although the concept of entertainment is broadening widely

Presumably any future work by David will be influenced the US hardware market – how popular the new Atari and Commodore machines prove, for example? "Well, I don't know about that. Activision has the advantage of being a software only company While I feel that long term there is a growth market for computers, I really don't care which companies are battling for shares

"The C128 is said to be a Commodore 64 with extra features but if Activision produce games for it using those features, we ought to try to do it so that it could run on the 64 as well, because of its huge user base

"As for the new Ataris, well, I'll believe them when I see them. There is one hell of a lot of rubber-gloved respect for Jack Tramiel in the States, and there's no doubt there has to be a good market for a machine with the power of a Mac at a third of the price "







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Spectrum Diy

Hardware *Spectrum Upgrade Kit* **Micro** Sinclair Spectrum **Price** £20 **Manufacturer** Sinclair Research Ltd, Upgrade Department, Stanhope Road, Camberley, Surrey GU15 3PS

The first Sinclair kit that I put together had nearly 90 parts and took me the best part of 3 long evenings to complete. That was the ZX81 which, with the ZX80 (126 parts), made Sinclair Research a company worth talking about and brought home computing prices down to a level that even I could afford. Now Sinclair is back in the kit business offering a cheap upgrade from Spectrum to Spectrum Plus.

The Spectrum Upgrade Kit has only 30 parts, and that includes everything, screws (10) to hold the thing together, documentation and a software cassette (four parts), the Plus casing complete with rubber feet and fold-down legs (10 parts), three small foam pads to protect the keyboard leads, and the three new circuit components which may need to be fitted. Just three components to change, this kit is just not in the same league. It took me half an hour to complete my upgrade and in the end I only had to use two components, only one of those requiring soldering.

The most important item for any kit is the instruction sheet. I find it very difficult to fault the one that accompanies the Upgrade kit, it is very clear and complete. There are slightly different things to do depending on which issue Spectrum you have. Issues 1 and 2 have a metal heatsink which is slightly too big to fit inside the Spectrum Plus case. An alternative, cut-down, heatsink is provided in the kit which must be bolted into place. This is the first of those three components and is no trouble to fit, so long as you have at least three hands. Be careful when fitting the heatsink to get it correctly positioned on the circuit board. If it is twisted too far it can short some of the other circuitry.

Soldering on

A reset switch is the first, and possibly only, thing to require soldering. The important thing to remember when soldering, especially when you do not do it very often, is to take things slowly and carefully.

Some tips if you have not done much soldering – make sure the soldering iron has a secure stand (the top of a table will not do), keep the tip clean using a small damp sponge, shake off excess solder (using the sponge, don't flick molten solder on the carpet), use flux-cored solder sparingly. To solder a single joint you may need the help of someone else. Soldering iron in one hand, solder in the other, the friend holds the joint together using say a pair of long-nosed pliers to keep from getting burned fingers.

Apply a very small amount of solder to the iron before you start, this cleans the tip a little and will also help to heat up the joint when the iron is touched against it. Hold the tip of the iron gently against the complete joint for perhaps a second then touch the solder against the joint and tip of the iron. The solder should melt rapidly and flow over the joint. Don't put too much solder on, as it is very difficult to remove. Take away the solder and the iron without disturbing the joint and wait a few seconds for the melted solder to cool and solidify. The joint should be complete now, clean, neat, and strong.

One point to watch for with the reset switch is the length of the leads. The switch fits on the left hand side of the Spectrum Plus casing and the lead passes across to the right-hand side of the circuit board. The lead on my kit was only just long enough to reach across my Issue 2 board, best check yours before you solder it in.

Having fitted the reset switch it is time to test the keyboard. There is a possibility that some of the keys, particularly the *Stop* key will not work reliably, in which case a resistor (the third component that I mentioned above) will have to be soldered into place. This is a bit more fiddly than the reset switch and you will need a steady hand, particularly if your Spectrum is an Issue 1. The circuit board is now screwed into the new case.

The rest is relatively straightforward, no more soldering, just follow the instructions. Four rubber feet are pushed into the bottom of the case. This is perhaps the most awkward operation of the whole job as the holes are small and the feet have a life of their own.

Two fold-down feet slip into place easily (make sure that they are the right way round) and some self-adhesive foam pads are required to protect the keyboard leads. The backing to these foam pads was not well cut in my kit and was difficult to remove.

Finally the keyboard is connected for the last time and the top of the machine screwed into place. And there you have it, a Spectrum Plus. The Upgrade Kit does involve a very small amount of soldering but is otherwise quite straightforward. Allow yourself some time to make up the kit, the trick is to think carefully about each operation before getting yourself in a mess. The warranty comes back into force once the upgrade is completed satisfactorily. If you have real problems Sinclair will charge £10 to sort them out for you.

A couple of further observations on the finished article. There is a problem running some Kempston hardware and maybe others, so it is probably worth making a few phone calls to the manufacturers if you are worried. Interface 1 fits the Spectrum Plus casing but not quite as well as onto the old Spectrum and you can't use the flip-down legs with microdrives connected.

The keyboard itself seems well constructed but, although similar in design, is not as comfortable to use as the QL keyboard. The manual which comes with the Upgrade Kit is not as comprehensive as the old Spectrum Basic manual but is good for first-time users.

In competition

But the Upgrade Kit is in competition with other keyboard kits. How well does it compare? The Dk'tronics keyboard was on special offer at the recent ZX microfair for only £5 more than the Sinclair kit, so let's look at that. First no soldering is required at all, although you don't get a reset switch. The keyboard casing is much larger and both the Spectrum and Interface 1 circuit boards fit inside. I think the Spectrum Plus looks the better of the two but is less comfortable to work with. The Spectrum Plus provides 17 special keys for single key press entry of commonly-used combinations. Dk'tronics provides a separate numerical pad of 12 keys, including *Delete* and a decimal point.

The Sinclair Upgrade Kit is reasonably simple and is cheaper than nearly any other keyboard kit. It does not offer the same feel to the keys as typewriter-type independent keys but both offer a considerable improvement over the standard Spectrum. The Upgrade Kit offers more special keys than most others and lastly, and rather importantly, the completed Spectrum Plus is still covered by Sinclair's warranty.

John Cochrane

A jewel in the crown

Andy Pennell holds Digital's Gem up to the light

The announcement of the Atari ST micros at the US CES show in January has generated a great amount of interest, both in the States and in this country. Undoubtedly a lot of this is because the Atari machines are to use Digital Research's exciting new GEM operating system, so as a preview I used a version of GEM running on an IBM PC compatible.

GEM stands for Graphic Environment Manager, and gives a machine a very friendly interface with the user, in a similar way to the Apple Macintosh. The whole concept revolves around a 'mouse', which is a small box moved around on a flat surface, such as the desk, controlling a sort of cursor on the screen. By moving the mouse to a certain position, then pressing a button on it, certain events take place, such as selecting from menus, or moving windows. This is also known as a WIMP environment, standing for window, icon and mouse programs.

Windows under GEM and the Mac are rather different to windows on other machines, as they can be freely moved about the screen and have their size changed under user control, and if one gets covered up by another it will have its contents re-drawn when exposed again.

Icons are pictures or symbols shown on the screen instead of words, and from within a program, choices can also be selected by menus, whose titles are shown in a line at the top of the screen. When the mouse is moved on to them, a box containing all the choices (or icons) is printed underneath, and moving the mouse down the list and pressing the button selects the item.

GEM menus differ from the Mac ones, though I do now prefer the GEM method – this difference may be due to the fact that Apple is currently attempting to place a patent on its method. In most other respects GEM is a direct imitation of the Mac user interface, a fact unashamedly admitted by DR, as the Mac has established the standard for others to follow.

For a machine to run GEM, it normally requires a minimum of 256K Ram, disc drives, a mouse, and a screen resolution of 320 by 256, though it looks best with a resolution of 512 horizontally. At the moment it also requires MS- or PC-DOS and an 8086 family processor, but the Atari ST breaks a lot of these requirements. As GEM is in Rom on the Atari, 128K Ram can be used, and as it uses a 68000 processor, GEM has to be converted. However, as most of it written in C, a high level language, conversion is not as difficult as you may expect.

It is hard to imagine a GEM machine using cassettes, especially with so much Ram to save and load, but if the Atari disc drive actually appears at the ludicrous price of $100, then it shouldn't be a restriction for very long. GEM will apparently work with joysticks and even cursor keys, but I wouldn't like to try it. The Atari spec says that its mouse plugs into one of the joystick ports – I only hope it is a proportional joystick port, as a simple switched port would be a waste, and make GEM less useful.

On most machines, GEM sits on top of the resident operating system. For example, IBM clones run MS-DOS, which sits on top of the low level OS in Rom. GEM, along with GSX2 (the graphics part of GEM) loads into Ram at the same time, calling MS-DOS when necessary, for disc accesses and the like. On the Atari, both CPM/68k and GEM lie in Rom, along with low-level OS known as TOS (Tramiel Operating System). This gives a lot more user Ram than one would expect.

At the moment, GEM is almost finished for the IBM PC and clones, though in black-and-white only. The Atari version of GEM is based on CPM/68K version 2, which understandably has a high priority to complete. The only colour version of GEM in currently in existence is on the Tandy 2000, but I have regrettably been unable to see it. It should make an appreciable difference. All versions of GEM, regardless of the machine they run on, take account of any colour information contained in programs, whether they can actually display colour or not.

To the user, GEM offers great advantages, making programs much easier to use, and neater looking on the screen. To the programmer, it also offers a huge advantage – that of portability. Provided programs are written in a high level language, such as C or Pascal, and that a suitable compiler is available, they can be instantly ported across from one GEM machine to another, even if they use different processors. This means that programs written on one machine have a much greater market as conversions are so easy. GEM takes care of machine differences, such as screen resolution, colour, and Ram capacity, so that it need be no concern to the programmer. As I have found on the Mac, while the WIMP environment is terrific for the user, it can be a real nightmare for the programmer. Most standard programs for other machines have to be completely re-written to run under GEM or the Mac, because program flow is so different, and it can take time to adjust.

However, anyone that has got used to it writing for the Mac can easily move onto GEM, as the programming ideas are so similar. As a lot of US software houses have written business software for the Mac, GEM should not suffer a shortage for very long. Digital Research's Programmers Development tools I was shown look very similar to the Apple ones, and even share names in some cases, which will make it easier to move on to GEM. Also the technical manual looks easier to understand than the 1500-odd page 'Inside Macintosh' manual.

I have seen two programs running under GEM – *Desktop* and *GEMdraw*. *Desktop* is a close copy of the *Finder* on the Mac, and is usually the first thing a user sees when switching on the machine. It consists of a menu bar along the top of the screen, the rest of the screen being grey, forming the desktop itself.

Lying on the desk, as it were, are icons showing 'Floppy Disc' or 'Hard Disc'. On 'clicking' them with the mouse, they open up into a window, containing more icons for each of the files on the disc, or folders denoting sub-directories. Clicking on folders makes them open up into another window, and so on, so the desktop can get quite cluttered with windows full of icons for files. Applications can have their own icons, so for example programmers' tools are denoted by a hammer in a box.

Data files can also have icons, so all files produced by the *GEMdraw* program have a miniature technical drawing on them. Copying files from one disc to another is accomplished by simply



'dragging' with the mouse an icon from one disc's window to another

Deleting files is just as simple by dragging the icon into the wastebasket icon. The desktop thus allows all the features normally accomplished by commands entered at the A. prompt of other OSs by simple use of the mouse, and no need of keyboard at all, unless you rename something. Each window can have its size changed at will by simply dragging its bottom right corner around until it's the desired size.

GEMdraw is a close copy of *MacDraw*, a sophisticated graphics package. This is not to be confused with *MacPaint* and its imitations (such as the one supplied with the AMX mouse), which just handle bit images on the screen. *GEMdraw* treats all items separately, so, for example, if you draw a solid circle on top of a square, and then chose to move the circle somewhere else, the square underneath would reappear.

It can also handle text in various styles and sizes, though it show up quite a difference between the Mac and GEM – because the almost virtual-memory way the Mac handles fonts, it can hold as many fonts and sizes as can fit on the disc.

While GEM is ideal for applications programs, it offers fewer advantages to the games market. Few of the games available for the Mac use any of the WIMP features, except adventures which use pull-down menus for quick entry of commands. Using the mouse itself for controlling your spaceship or whatever is difficult in most games, but there are a few which can benefit from its fast movement. While *Jet Set Willy* with a mouse would be impossible, a game like *Galaxians* would be much easier using one. When mice become more popular on cheaper machines, I've no doubt inventive programmers will come up with new concepts that would only be possible with a mouse. Portability may not be relevant to games under GEM – they are usually written in machine-code, and I doubt if the standard GSX entry points would be sufficient for mega-games.

The Atari micros are the first to license the use of GEM for a home machine, but others may well follow. Sinclair has said that if it did become available in a suitable form they would offer it on the QL. The Beeb has recently had the AMX mouse released for it, and while it has no chance of running GEM, it does show a growing interest in WIMPs on home machines. In addition, it is rumoured that Sinclair will be producing a mouse for the QL, but not for several months yet.

I have been completely sold on the WIMP environment ever since getting a Mac, as it makes the most complex of programs so much easier to use, both for the novice and for the computer literate. All new machines that are expected to come out within the next year (that are not IBM clones) have a 6800-based architecture, attempt to bridge the gap between home and business, and run some form of WIMP environment. It would seem that GEM offers the ideal operating system.

Star Game

Light cycle

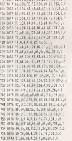
Multi-level action in this version of Lightcycle for the QL by *Philip Sproston*

In this version of Lightcycle for the Sinclair QL, there are three levels. Firstly, you must survive on the grid, avoiding the mines that appear, then on to play a computer controlled opponent. Finally, you face the opponent and deadly mines.

Program Notes

The user-defined characters should be compatible for all versions of the QL. Once the characters have been defined, if you wish to print on the screen using the old characters you must call the procedure 'oldset'. Lines 1620 and 1630 can be altered if you want different keys to control the lightcycle. Lines 1040 to 1250 contain the various procedure calls, and can be altered to have different or additional levels, using your own procedures.

```
10 REMark LIGHTCYCLE by P SPROSTON
100 MODE 8
110 WINDOW 512,256,0,0:PAPER 0:CLS:WINDOW 442,201,30,15
   CLS:WINDOW 0,442,0,17,  4
130 INK 7:CSIZE 3,1:AT 0,1:PRINT "LIGHTCYCLE":FOR C=LEN(..) TO 1
   STEP -1:CURSOR 132,3:PRINT ... TO 1
   :BEEP 5 ... 2,15 ... NEXT C
140 INK 4:CSIZE 0,1:PRINT "PLEASE WAIT" WHILE" FOR C=LEN
   ... STEP -1 AT 4,9 PRINT ... TO 1
   BEEP 500, ... ,2,12, ... NEXT C
150 ... "CHARACTERS ARE DEFINED":FOR C=LEN(...) TO 1
   STEP -1:AT 5,6:PRINT ... TO 1
   BEEP 500,C/2, ,12 ... NEXT C
160 HI=4000:HICY=5:HN$="NO-ONE":GO TO 1000
200 DEFine PROCedure USR
210 FONT 16776...
220 OLDBASE=PEEK_L(...)
230 NEWBASE=RESPR(875)
240 FOR C=0 TO 875 STEP 4
250 POKE_L NEWBASE+C,PEEK_L(OLDBASE+C)
260 END FOR C
270 END DEFine USR
300 DEFine PROCedure NEWSET
310 POKE_L FONT,NEWBASE
320 END DEFine NEWSET
350 DEFine PROCedure OLDSET
360 POKE_L FONT,OLDBASE
370 END DEFine OLDSET
400 DEFine PROCedure POKEIN
410 RESTORE 600
410 READ A
420 IF A=999 THEN
430 END DEFine
440 END IF
450 CHARBASE=NEWBASE+1... 32)*9
460 ... 1 ... PRINT ... FOR C=1 TO 9
470 READ B
480 POKE CHARBASE+C,B
490 END FOR C
500 GO TO 410
600 DATA 97,16,16,16,56,124,56,16,16,0:REMark CROSS
610 DATA 98,0,0,120,120, ... :REMark ...
620 DATA 99,0,0,32, ... :REMark BIKE LEFT
630 DATA 100, ... :REMark BIKE RIGHT
640 DATA 101, ... 56,120,40,40,16,16, ... :REMark BIKE UP
650 DATA 102,0, ... 40,40,120,56,16, ... :REMark BIKE UP
660 DATA 103, ... 56,56,124,56,56, ... :REMark DIAMOND
670 DATA ... 128,40,16,40, ... :REMark ENEMY1
680 DATA 105, ... 68, ... :REMark ENEMY2
690 DATA ... 124,56,68,68,68,68,68,68,124:REMark SQUARE
700 DATA 65,56,68,124,68,68, ... 0,0
702 DATA 66, ... 120,68,68,124,0,0
704 DATA 67,124,68, ... 64,64, ... 4,0,0
706 DATA 68, ... 68,68,68,68,116,124,0,0
708 DATA 69,124,64,64, ... 64,64,124,0,0
710 DATA 70,124,64,64,112,64 ... 
712 DATA 71,124,68,64,80,68,68,124,0,0
714 DATA 72,68,68,124,68,68,100,100,0,0
716 DATA 73, ... 24,24,24,124,0,0
718 DATA 74,4,4,4,4,12, ... 
720 DATA 75,64,68,124,80, ... 100,0,0
722 DATA 76,64,64,64,64, ... 0,0
724 DATA 77,68,108,84,84,68,100, ... 0,0
726 DATA 78,68,100, ... 84, ... 
728 DATA 79,124,68,68,68,100,100,124 ... 
730 DATA 80,124,68,124,64,64, ... 0,0
732 DATA 81,124,100,100, ... 84, ... 116, ...
734 DATA 82,124,68,68,124,72, ... 100, ...
736 DATA 83,124,68,64,124,4,92,124,0,0
738 DATA 84,124,16,16,16,16,24,24,0,0
740 DATA 85,68,68,68,68,68,116,124,0,0
742 DATA 86,100,100,68,68,68,104,16,0,0
744 DATA 87,100,100,68,68,84,84, ... 0,0
746 DATA 88,68,68,56,16,108,68,68,0,0
748 DATA 89,100, ... 68,56, ... 16,0,0
750 DATA 90,124,4,8,16,32,76,124,0,0
752 DATA 48,124,68,68,68,68,68,124,0,0
754 DATA 49,16,48,112, ... 24,24,124,0,0
756 DATA 50,56,68,4,28,32,76,124,0,0
758 DATA 51,68,68,4,28,4,68,68,0,0
760 DATA 52,96,96,64,72,124,8,8,0,0
762 DATA 53,124,64,124,4,68,68,68,0,0
764 DATA 54,124,64,64,124,68,116,124,0,0
766 DATA 55,124,68,4,8,16,24,24,0,0
770 DATA 56,124,68,68,56,68,92,124,0,0
772 DATA 57,124,68,124,4,4,92,124,0,0
800 DATA 999
999 REMark SET UP
1000 USR
1010 POKEIN:NEWSET:BEEP 501,5:INSTRUCT:BEEP 500,5
1015 REMark GAME START
1020 HIPRINT:BEEP 500,5:DIM A%(18,35):SCORE=0:CYCLE=1
   :LEVEL...
1025 WINDOW 512,256,0,0:PAPER 0:CLS
1030 INK 4:PAPER 0
```





```
1035 REMark LEVEL 1
1040 SETUP:SCREEN:CRASH
1070 MOVEME:CRASH:PRT:UPDATE:BLOB
1110 IF SCORE <5% THEN GO TO 1150
1120 GO TO 1070
1135 REMark LEVEL 2
1150 SETUP LEVEL=2:SCREEN:CRASH
1170 UPDATE:ENEMY:PRTENEMY:MOVEME:CRASH:PRT:ENEMY:PRT:ENEMY:GO TO 117
1200 REMark LEVEL 3
1250 SETUP LEVEL 3:SCREEN:CRASH
1260 UPDATE:MOVEME:CRASH:PRT:ENEMY:PRTENEMY
1270 IF KEYROW(1)=2 OR KEYROW(1)=8 THEN GO TO 1260
1290 BLOB:ENEMY:PRTENEMY:GO TO 1260
1300 DEFine PROCedure SETUP
1310 FOR C=0 TO 18:A$(C)="aaaaaaaaaaaaaaaaaaaaaaaaaaaaaaaaaaa":END FOR C
1320 B=2:Y=RND(5 TO 30):P=0:B=0:GO TO 181
1330 P=2:D=RND(7 TO 18)
1340 IF D=Y THEN GO TO 1320
1350 C=1:Z=1:Q=1:V=1:END DEFine
1500 DEFine PROCedure SCREEN
1510 CLS:CSIZE 0,0:PRINT "                LEVEL: ";LEVEL
1520 WINDOW 448,200,32,15:BORDER 5,5
1530 WINDOW 447,201,32,15:BORDER 5,5:CSIZE 1,1:CURSOR 4,4:INK 2:PRINT "SCORE
     ...
1540 CSIZE 0,0:AT 3,0:FOR C=1 TO 18
1545 PRINT "aaaaaaaaaaaaaaaaaaaaaaaaaaaaaaaaaaa":END FOR C
1550 INK 2:PRINT ...                    LIGHTCYCLE ...
     BEEP 50 ...
1600 DEFine PROCedure MOVEME
1610 C1=1:D1=Y
1620 IF KEYROW(1)=8 THEN GO TO 1630:REMark 2
1630 IF KEYROW(1)=32 THEN GO TO 2000:REMark ...
1634 GO TO 1900
1635 IF B= THEN GO TO 17..
1640 IF S=1 THEN
1650 S=0:T=1:GO TO 2000
1660 END IF
1680 S=0:T=
1690 GO TO 2000
1700 IF T=1 THEN
1710 T=0:S=0:GO TO 2000
1720 END IF
1730 T=0:S=1:GO TO 2000
1799 REMark RIGHT
1800 IF S=0 THEN GO TO 1900
1810 IF S=1 THEN
1840 S=0:T=1:GO TO 2000
1850 END IF
1860 S=0:T=1:GO TO 2000
1900 IF T=1 THEN
1910 T=0:S=-1:GO TO 2000
1920 END IF
1930 T=0:S=1
2000 AT D1,C1:INK 2:PRINT "b"
2010 IF S=0 THEN GO TO 2100
2040 IF T=1 THEN
2050 B$="f":GO TO 2200
2060 END IF
2070 B$="a":GO TO 2200
2100 IF S=1 THEN
2110 B$="h":GO TO 2200
2120 END IF
2130 B$="c"
2200 C=C+S:Y=Y+T:SCORE=SCORE+10:END DEFine
2204 DEFine PROCedure PRT
2210 INK 5:AT Y,C:PRINT B$:END DEFine
2300 DEFine PROCedure CRASH
2310 IF Y<0 OR Y>18 OR C<1 OR C>35 THEN GO TO 2340
2320 IF A$(Y,C)="a" THEN
2330 A$(Y,C)="b":END DEFine
2335 END IF
2340 FOR C=7 TO 0 STEP -1
2345 AT D1,C1:INK C:PRINT B$
2350 BEEP 1000,15-C,10-C,5,1,0:FOR V=1 TO 3:NEXT V
2360 NEXT C:BEEP:CYCLE=CYCLE+1
2370 IF LEVEL=1 THEN GO TO 1040
2380 IF LEVEL=2 THEN GO TO 1150
2390 GO TO 125
2400 DEFine PROCedure HIT
2430 IF RND(1 TO ...) ... END DEFine
2435 M=RND(1 TO 18):H=RND(1 TO 34)
2440 IF A$(M,H)<>"a" THEN GO TO 2435
2445 IF M=Y+1 AND H=C+1 THEN GO TO 2435
2450 AT M,H:INK 7:PRINT "g":OVER 1:AT M,H:INK 7:PRINT "g":OVER 0
2460 A$(M,H)="g":END DEFine
2500 DEFine PROCedure UPDATE
2510 INK 4:CURSOR 12,4:CSIZE 1,1:PRINT SCORE:INK 5:AT 0,0:CSIZE 0,0:END DEFine
3000 DEFine PROCedure ENEMY
3010 U=0:W=0
3020 IF Q<2 OR Q>17 OR P<2 OR P>33 THEN GO TO 3050
3030 IF A$(Q+W,P+U)<>"a" THEN END DEFine
3040 IF U=0 THEN GO TO 3...
3055 IF Q>16 AND ... THEN GO TO 3075
3057 IF Q<10 THEN GO TO 3070
3060 IF A$(Q+1,P)="a" THEN GO TO 3080
3065 U=1:W=0:END DEFine
3070 IF A$(Q-1,P)="a" THEN GO TO 3080
3075 U=0:W=-1:END DEFine
3080 IF A$(Q+1,P)="a" AND A$(Q-1,P)="a" THEN GO TO 3100
3090 IF A$(Q+1,P)="a" AND A$(Q-1,P)="a" THEN
3095 U=0:W=1:END DEFine
3100 END IF
3110 IF A$(Q+1,P)="a" AND A$(Q,P-1)="a" THEN
3120 W=0:U=1:END DEFine
3130 END IF
3140 U=0:V=-
3150 IF RND ... THEN V=1
3160 END DEFine
3200 IF ... AND P<35 THEN GO TO 3225
3205 IF ... THEN GO TO ...
3210 IF A$(Q,P+1)="a" THEN GO TO 37..
3215 ... END DEFine
3220 IF A$(Q,P-1)="a" THEN GO TO 3240
3223 ... END DEFine
3225 IF A$(Q,P+1)="a" AND A$(Q,P-1)="a" THEN GO TO 32..
3230 IF A$(Q+1,P)="a" AND A$(Q,P+1)="a" THEN
3240 V=1:U=0:END DEFine
3245 END IF
3250 IF A$(Q,P+1)="a" AND A$(Q,P+1)="a" THEN
3260 V=0:U=-1:END DEFine
3270 END IF
3280 U=-1:V=0
3320 IF RND ... THEN V=1
3330 END DEFine
3500 DEFine PROCedure PRTENEMY
3510 AT Q,P:INK 0:PRINT "b":A$(Q,P)="b"
3520 IF ... THEN GO TO 35..
3530 ... GO TO 35..
3550 ... "h"
3600 ...:INK 4:AT Q,P-1:PRINT D$:END DEFine
4000 DEFine PROCedure BLOB
4010 IF RND(1 TO 9)<>1 THEN END DEFine
4020 K=RND(1 TO 35):L=RND(3 TO 18)
4030 IF A$(L,K)<>"a" THEN GO TO 4020
4040 IF K=... AND L=Y+1 THEN GO TO 4020
4050 AT L,K-1:INK 7:PRINT "g":OVER 1:AT L,K-1:INK 1:PRINT "g":OVER 0
     INK 0:A$(L,K)="g":END DEFine
5000 REMark ENEMY CRASH
5010 FOR C=7 TO 0:FOR N=7 TO 0 STEP -1:AT Q,P:INK N:PRINT D$:
     BEEP 7,4,1,4,3,12,5:NEXT N:NEXT C:BEEP
5050 IF LEVEL=2 THEN GO TO 1250
5100 WINDOW 512,256,0,0:CLS:CLS:WINDOW 442,201,32,15
5070 CSIZE 3,1:INK 5:AT 0,9:PRINT "LIGHTCYCLE"
5080 CSIZE 0,0:INK 6:AT 4,0:PRINT "YOU HAVE ACHIEVED A LOWEST SCORE OF:"\\
     "] CSIZE 0,1:FLASH 1:INK 2:PRINT SCORE:FLASH 0
5090 CSIZE 0,0:INK 6:PRINT \ "AND YOUR NUMBER OF CYCLES USED WAS:"\\
     "]:CSIZE 0,1:INK 2:FLASH 1:PRINT CYCLE:FLASH 0
5100 IF SCORE>HI AND CYCLE<HICY OR SCORE>HI AND CYCLE=HICY THEN GO TO 651
5200 INK 4:CURSOR 75,149:PRINT "I  FOR INSTRUCTIONS":CURSOR 145,170:
     PRINT "G  FOR GAME"
5205 AT 0,0:CSIZE 3,1:FOR C=1 TO 7
5207 AT 0,9:INK C:PRINT "LIGHTCYCLE"
5210 IF KEYROW(7)=64 THEN GO TO 1020
5220 IF KEYROW(5)=4 THEN
5230 INSTRUCT:GO TO 1020
5240 END IF
5250 NEXT C:GO TO 5205
5400 DEFine PROCedure HIGH HI
```

continued on Page 18 ▶

Star Game

◄ continued from Page 17

```
[illegible]
[illegible] NUMBER OF [illegible]
[illegible] NEXT [illegible] FOR C=1 TO [illegible]
[illegible] PRINT "PRESS ENTER TO START":IF [illegible]
[illegible] THEN END DEF [illegible]
[illegible] SCORE [illegible]
[illegible] THE DESTMACHINE [illegible]
[illegible] THEMACHINE TO BECOME [illegible]
[illegible] LIGHTCYCLE
[illegible] GAME [illegible]
[illegible] THEN END DEF [illegible]
[illegible] THEN
[illegible]
[illegible] SCROLL [illegible] BEEP [illegible] END FOR [illegible]
[illegible] "LIGHTCYCLE"
[illegible] SOMETHING OF THREE LEVELS"
[illegible] FOR RIGHT"
[illegible] YOU MUST [illegible] POSSIBLE [illegible]
[illegible] MUST NOT HIT ANY [illegible]
[illegible] SURPRISED BY THE [illegible]
[illegible] CURSOR [illegible] PRINT "PRESS ENTER [illegible]
[illegible] THEN GO TO [illegible]
[illegible] GO TO 7260
[illegible] AT [illegible] FOR [illegible] PRINT"
END FOR
[illegible] PRINT "LEVEL [illegible] UNDER [illegible] PRINT "IN THIS [illegible]
[illegible] ACHIEVE A SCORE OF [illegible] POINTS [illegible] YOU MUST NOT HIT ANY [illegible]
[illegible]
[illegible] THEN GO TO [illegible]
[illegible] GO TO [illegible]
[illegible] FOR [illegible] TO [illegible] PRINT [illegible] END FOR C
[illegible] AT [illegible] UNDER [illegible] PRINT "LEVEL2":UNDER [illegible] PRINT [illegible] IN THIS LEVEL YOU MUST FORCE
THE ENEMY CYCLE INTO AN OBSTRUCTION OR INTO YOUR OWN TRACK
[illegible] IF KEYROW [illegible] THEN GO TO [illegible]
[illegible] GO TO 7340
[illegible] AT [illegible] FOR [illegible] PRINT" [illegible] END FOR C
[illegible] UNDER [illegible] PRINT "LEVEL3":UNDER [illegible] PRINT [illegible] IN THIS LEVEL YOU MUST
AGAIN FORCE THE ENEMY CYCLE IN [illegible] CORNER [illegible] YOU MUST ALSO AVOID [illegible]
[illegible] MINES AND BARMY CAPSULES "
7400 IF KEYROW(1) [illegible] THEN GO TO 7420
7410 GO TO [illegible]
7420 AT [illegible] FOR [illegible] PRINT " [illegible] END FOR C
7430 AT [illegible] PRINT "REMEMBER YOU WANT AS LOW A SCORE AS POSSIBLE "
7440 IF KEYROW(1) [illegible] THEN END DEFine
7450 GO TO [illegible]
[illegible] PRINT "ABCDEFGHIJKLMNOPQRSTUVWXYZ"
[illegible] PRINT "abcdefghijklmnopqrstuvwxyz1234567890"
9998 STOP
9999 DELETE MDV1_LIGHTCYCLE SAVE MDV1_LIGHTCYCLE
10000 STOP
[illegible] OPEN [illegible] PRINT [illegible] CHR$ [illegible] PRINT [illegible]
[illegible] TO 9999
```

Competition

Journey beyond the stars . . .

This week *Popular* is giving away (well, you have to answer a few questions first) 25 copies of the Amstrad version of the highly successful arcade spectacular from Realtime Software – *3D Starstrike*.

An arcade shoot-em-up that unashamedly requires you to zap and zap again and weave your space fighter through a nightmarish collection of fiendish obstacles that rush towards you in glorious 3D perspective. With detailed hi-res graphics and awesome sound effects, *3D Starstrike* on the Amstrad promises to be one of the successful arcade thumb busters of the year. Want one for nothing?

The Competition

There are 25 games to be won. The winners will be the first 25 readers whose names are drawn from an old box or similar makeshift receptacle who have correctly answered the following questions:

1) Who was the second man to set foot on the moon?

2) What was the name of the teddy bear like creatures in *Return of the Jedi*?

3) What song did HAL sing?

What to do

If you think you know the answers to the questions jot them down in the box below and send the completed form in an envelope to Starstrike Competition, *Popular Computing Weekly*, 12-13 Little Newport Street, London WC2H 7PP. Closing date for the competition is March 22nd. The Editor's decision is final.

Your answers.

1) ....

2) ....

3) ....

Name ....

Address ....

....



Slave of serf

Program *Castle of Jasoom* **Price** £12 95 **Micro** Commodore 64/Disk Drive **Supplier** Quicksilva Mail Order, PO Box 6, Wimborne, Dorset BA21 7PY

In the affluent USA almost every hacker owns a disk-drive Because British computer buffs favour the cassette system, there aren't too many dedicated disk games around. The advantages of using a disk-based game are considerable In this case, a fairly ordinary game is transformed into something eminently playable The adventure area is huge Once a particular level has been compleaad, the computer simply loads up the next aaction

The adventure begins in the *Castle of Jasoom*. It is your job to find the fabled Jasoom Diamond and so prove that you are the rightful ruler Experience points can be collected on the way While exploring the network of rooms and passages in the castle, you can expect a few surprises Sarcastic comments like "It's a bit crowded round here as you are surrounded by killer spiders and poisonous snakes" are common.

The joystick is used for control along with the function keys, for taking, attacking, firing arrows and using a shield. *Castle of Jasoom* is described as a real time action interactive film. That may be stretching poetic licence a bit far, but it certainly provides fast-moving action. Strategy is also important as many different clues and problems need to be solved.

At the end of each game a raong is given, starting with slave, serf, vassal, etc Although the graphics aren't spectacular, I found *Castle of Jasoom* a bit different and very challenging You certainly won't get bored

Tom Hussey

Poetical

Program *Penguin Study Software - Julius Caesar* **Price** £7 95 **Micro** Spectrum 48K **Supplier** Penguin Books Ltd, Harmondsworth, Middlesex.

Friends, students and countryman, lend me your Spectrums I come to praise *Caesar*, not to bury it The immortal bard and the micro may seem an unlikely combination, and a study aid for CSE and O-level students lacks the immediate appeal of the latest high-scoring arcade game, but Penguin's contribution to literary criticism is genuinely revolutionary

Not that it will write your essay for you, but as criticism is at least 50 percent a process of sorting the relevant facts then asking pertinent questions about them, it will reduce much of the initial hard work A simple menu system provides a choice of 17 key themes, from Alchemy to Wasping, and eight people or groups You can also specify an act

Choose your combination of themes and/or people, in any acts, and the micro searches the database to display not just line references but also indications of their relevance and pertinent questions. Cross references are also suggested.

The system used seems flawless and essays such as 'Discuss the imagery of sickness in relation to Caesar in Act I' will suddenly become manageable The highest praise that I can offer is that I wish this program had been around when I was studying English.

John Minson

Help for hacks

Program *Datatext* **Price** £4 95 **Micro** Spectrum 48K **Supplier** P R Software, 8 Beechwood Rd, Chippenham, Wiltshire SN14 0EZ

First the microdrive than the Spectrum + have gone some way to making Sir Clive's little micro a viable word processor Realising that competition among such programs will be steep, P R Software have produced this one at a bargain price

Datatext's screen divides into three windows, at the bottom are various status checks; all typed input passes through the middle one, above a larger display contains automatically formatted text Many features expected of word processors are here, block delete and move, string search and replacement, various printer widths and, of course, correction with editing via the middle window A few features are missing though, such as right justification and a word counter The documentation, written with the program and dot-matrix printed, is sufficient, though a quick reference sheet would not go amiss

Writing is a highly personal activity, whether it's with a pen or micro I can't say that I found *Datatext* easy to use, but then again I've hardly had time to become accustomed to it A hardened hack is unlikely to be using a Spectrum to write anyhow, and for the impoverished occasional scribe it may prove a good budget choice

John Minson

Cheeky with it

Program *Castle Quest* **Price** £12 95 **Micro** BBC **Supplier** Micro Power, Sheepscar House, Sheepscar Street South, Leeds LS7 1AD

Probably the most challenging game every devised for the BBC micro, says the blurb on the jacket of Micropower's *Castle Quest* in what is probably the cheekiest piece of hype advertising for a piece of Beeb software devised so far this year *Castle Quest* is fun, but a serious rival to *Elite* it isn't.

This is an "arcventure" game, of a type which is relatively new in the BBC range of games After a loading screen accompanied by a rendition of *The Sorcerer's Apprentice* apparently played by a chorus of tin whistles, you find your character standing in what looks rather like a building site, with scaffolding and ladders the main features You are, in fact, on the outskirts of the Wizard's castle and your object is, inevitably, to find and filch the old boy's treasure

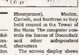
This is no easy task for as you move along (the graphics are colourful if a little simplistic and the sideways scrolling is remarkably smooth) you will meet many hazards, including spiders, trolls and a witch, as well as discovering

various objects which will help you at different stages

Castle Quest is keyboard-controlled which, since events happen very fast, will cause several deaths at first until you get the hang of the commands You can pick up, drop or "store" items (four at any one time) and you can also throw or thrust them at menaces This tends to work best when using real weapons such as the sword I found that trying to frizzle the spider with the torch or brain the troll with the aqualung didn't get me very far

Apart from manipulation of objects, there are adventure elements in other parts of the game Getting carted off to a dungeon cell is a real risk and, unless you can figure out an adventure-type sequence of actions (and have the right objects with you), you may stay there for the duration This is an attractive game which should do well on its own merits, but Micropower are doing it no favours by inviting comparison with Acornsoft's megagame

Barbara Conway



Don't miss it

Program *The Lords of Midnight* **Price** £9 95 **Micro** Commodore 64 **Supplier** Beyond, Competition House, Farndon Road, Market Harborough, Leics

Lords of Midnight is the first adventure in the Midnight trilogy – the second, *Doomdark's Revenge*, is already available for the Spectrum.

I tend to find normal adventures a bit frustrating – how many times have you been told, "I do not see a table here", when there is one clearly in the picture? *Lords of Midnight* is totally different, it is more like an experience Can you imagine controlling the main characters in the *Lord of the Rings* saga as they wage war against evil?

It is the day of the Solstice, the beginning of winter, and the forces of Midnight are gathering for war and the peoples of the Free must be protected from Doomdark, the Witchking of Midnight. You star by being able to control four different characters: Luxor (the Moonprince), Morkin, Corleth, and Rorthron as they hold council in the Tower of the Moon The computer controls the forces of Doomdark and other independent characters

The screen display shows the view in full perspective, as if you were looking through the eyes of the hero, not as a map You have the ability to look in any of the eight directions of the compass, and apparantly, 32,000 different panoramic locations can be visited. On your travels, you will be able to recruit men and gain allies in your quest to destroy Doomdark.

What I liked about this game is that a choice of possible actions is given for each location, and you can choose one with a single key-press

Space is much too short to describe even half of the feature of the Lords of Midnight, but just imagine yourself in command of thousands of warriors and riders as they charge into battle

I nearly gave this epic adventure six stars – it should certainly not be missed

Tom Hussey

Bargain

Program *10 Pack* **Price** £10 **Micro** Spectrum 48K **Supplier** Automat U K. Ltd., 27 Highland Road, Portsmouth, Hants. PO4 9DA

An enduring feature of ZX Microfairs is the Automata mob flogging programs not half price, not quarter price but to you, guv, a quid! Those who've hitherto avoided the throng in Ally Pally can now buy ten of the Pi Man's favourites at this giveaway price

At times it's easy to forget that Automata are more than just a weekly cartoon and a crazy concept Here, however, is their history from the uninspiring dice game, *Yakzee*, to the used-car salesman simulation, *New Wheels John?* which kept me up all night trying to out-Arfur Daley because of its humorous approach to a genre normally missing human elements

Upsetting the norm is the key to Automata *Morris Meets the Bikers* (what – more clapped-out autos?) and *Piromania* enliven the platform game by having an endearing hero in the former and a hair and fire-raising scenario for the latter. Who but Automata would make alcoholic intake an integral part of *Darts* or even write a pub-crawling, *Pi-Eyed* Pi Man variation of *Frogger?*

Olympimania proves to be a disappointing jumping game but *Pi-Balled* is a good *Q-Bert* and its hero turns up again in *Pi-in'Ere* Finally *Crusoe* is an adventure unlike any other which I found almost unplayable, others may disagree

That's the point of this compilation, at the price you can afford the bad because of the good True to form though, at the recent Microfair Automata were discounting it further!

John Minson

Challenging

Program *Roland Goes Square Bashing* **Price** £7.95 **Micro** CPC464 **Supplier** Amsoft (via Durrell) Brantwood House, 189 Kings Road, Brentwood, Essex CM14 4EE

Roland, looking like a Tate and Lyle sugar man in his latest incarnation has to bounce diagonally around on a three dimensional layout of squares but after cursing the game for at least ten minutes I slowly cottoned on that it wasn't another version of *Q-Bert*

Each square that Roland stands on slowly but inexorably disappears forcing him to jump to the next or fall to his doom. However the layout of the squares on the twenty screens is frequently extremely complex with many of them overlapping each other, obscuring those behind and forcing you to think very quickly indeed In all it's a well executed game that I found to be both enjoyably different and intellectually challenging

Tony Kendle

Defy dragons

Program *Colossal Cave Adventure* **Price** £7.95 **Micro** Commodore 64 **Supplier** Duckworth, The Old Piano Factory, 43 Gloucester Crescent, London NW1 7DY

Peter Gerrard is taking us back into very traditional questing territory with this package from Duckworth, an adaptation of the original Crowther and Woods mainframe adventure on which many of my generation of computer enthusiasts grew up. But don't be put off by the ancient pedigree. Although seasoned adventurers may find that they can guess the obstacles to come by the objects they find, it is still an absorbing world of its own to anyone who has not yet experienced it.

This is a text-only treasure hunt through a strange and magical land, where all the now-familiar monsters and puzzles throng in a wide-spread layout with plenty of good descriptions and the facility to call up clues if you're willing to sacrifice some points. Defy the dragon (of course you knew that there *had* to be a dragon somewhere when you came across the bird, didn't you?), trounce the troll and, if you can keep the thieving pirate at bay, pile up riches in the wellhouse.

The screen layout is fairly clear, with yellow text on a black background and some text highlighted, and responses to the verb/noun command input are fast with a wide vocabulary to draw on. Not so much of a visual treat as many new graphical games, but still good, enjoyable brain exercise.

Barbara Conway

Powerful

Program *Assembler/Monitor 64* **Price** £19.99 **Micro** Commodore 64/Disk Drive **Supplier** First Publishing Ltd, Unit 20B, Horseshoe Road, Horseshoe Park, Pangbourne, Berks

Anyone with ambitions towards writing arcade games will need to master machine code – at least for programming the action sequences. Unfortunately, the masses of numbers that occur in machine code listings put off many beginners. This is a pity, because a good Assembler can take much of the sweat out of machine code programming. By allowing us to write our programs in the more easily understood tokens (which the Assembler then converts into machine code) the whole process can be speeded up no end.

Assembler/Monitor 64 allows programs to be entered using line numbers, just like Basic. Lines can be changed, deleted or inserted exactly as in Basic. The Assembler uses two passes and therefore allows the use of labels for loops.

A powerful feature of this package is the use of "expressions". By using a recursive routine for calculating nested expressions, *Assembler/Monitor 64* steals a march on many of its rivals. Arithmetic and logical operations can be used in expressions, and all operations are performed using 16 bit arithmetic.

A comprehensive set of pseudo op-codes are supported – you can even return to Basic if you wish. (Some care is needed when using this option). Error messages are displayed on both pass 1 and pass 2. Syntax errors are accompanied by a number which identifies the type of error.

Monitor 64 can be loaded concurrently with *Assembler 64*. Among other things, it allows machine language programs to be saved, loaded, executed or disassembled.

The best advice that can be offered to anyone interested in machine code programming is to go out and buy the best assembler he can afford. In the long run, you get what you pay for, and *Assembler/Monitor 64* certainly provides value for money.

Tom Hussey

Adults only

Program *Star Watcher* **Micro** CPC 464 **Price** £24.95 **Supplier** Amsoft, Brentwood House, 169 Kings Road, Brentwood, Essex CM14 4EE

In the field of genuinely useful things that can be done with a home micro there can be little doubt that the most underdeveloped area is that of decent 'adult' educational software. With the possible exceptions of one or two language programs or some releases by Sinclair the only people who seem to be working in this area are Triptych software who have released their Brainpower series under the Amsoft label.

Of their range *Star Watcher* is one of the more specialist packages and most people will have very strong ideas about whether or not the subject appeals to them but it bears all their usual hallmarks of very well designed and thought out programs backed up by a manual packed full of useful information. The package is divided into two halves – the first concentrates on teaching you the fundamentals of astronomy and the way our view of the stars is determined by our position on the earth's surface.

However none of the above necessarily needs to be tackled before you go on to the second tape which is essentially an applications package which contains a database of the brightest stars visible from earth. Using this you can call up a graphical representation of the sky at any time or any point on the earth's surface. Following from this the program can be made to step through the way the stars' positions change as you change either your position or the time of viewing.

There are more features than I can possibly document here and for interested 464 owners I feel that this package will be indispensible. I know it's pricey but that's inevitable when producing quality for a small market.

Tony Kendle

Wrong track

Program *Trains* **Price** £7.95 **Micro** BBC B **Supplier** Acorn User, Redwood Publishing, 68 Long Acre, London WC2E 9JH

Thank goodness British Rail do better than this! Peter Balch's game is promoted by a commercial BBC User Group Magazine and one might suppose it was state-of-the art. Sorry, no.

This rail network is strictly steam trains – unlikely Thomas the Tank Engine shapes – chugging slowly round a bird's nest of tracks. The aim is to take passengers from each of four stations to the one they want. The intended problems are that you have to control up to four trains, change points, stop at stations, reverse, etc.

The real snag, however, is the track ... it's built by a barmy algorithm which is supposed to give you the joys of a random layout with each new game.

In fact it takes ages to draw each screen and often doesn't even join up the stations. (There's an on-screen apology that there wasn't room to ensure that! Tell that to 'Elite'!) As an additional trap the control keys don't always respond – but by the time you discover that you won't care.

Jon Watterson


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Into fast gear

Speed up your Basic programs on any machine with a few tips from ***Paul Tolman***

Many of you will have wondered if it's possible to speed up your Basic programs without having to buy a compiler. Obviously interpreted Basic programs will never run as fast as machine code programs, but by following a few simple rules considerable improvements in performance can be obtained.

For the uninitiated the 'interpreter' is the program built into your micro which translates a Basic program into machine code as the program is run. This process is very time consuming – which is why Basic is slow.

Firstly consider how the interpreter deals with line numbers. In Basic, lines can be of variable length and don't have to be numbered sequentially. This is a big problem for the interpreter, for when it sees a statement like *'Goto 100'* it doesn't know where the Basic instructions for Line 100 are in memory. Thus the interpreter has to search through the program line by line, starting at the first line, until it finds the line in question. This is a very time consuming process, particularly as many Basics don't then remember where the line is for future use (eg, in the loop *'for t=1 to 20 goto1000.next t'* line 1000 has to searched for 20 times!)

Two major ways of improving performance arise from this. First, try and put the most frequently used subroutines at the beginning of the program as they will be found quickly when called. This is very important with large programs. Some of the more advanced interpreters (eg, IBM PC) remember a line's location after the first search and so the above doesn't apply). Secondly, *Gosub Return* is likely to be faster than the equivalent *Goto Goto*, eg

```
SLOW
 10 goto 100
 20 (next line)
 30
100 print "Hello":goto 20
FASTER
 10 gosub 100
 20 (next line)
 30
100 print "Hello" return
```

In many programs it is necessary to have loops that are iterated (executed) many times. It is important to realise that the statements in a loop (the 'body' of a loop) have to be interpreted separately on every iteration. Thus it is very important to make sure that the code in any loop is as fast as possible – saving 1/10 of a second on every iteration adds up to a lot of time if the loop is executed several hundred times, so don't put *Rems* or *Data* statements inside a loop if you can avoid it.

Talking of loops *For ... Next* loops are faster than the equivalent using *If ... Then ... Goto* loops, eg:

```
FAST
 10 for t=1 to 20
 20 (body of loop)
 30 next t
SLOW
 10 t=1
 20 (body of loop)
 30 t=t+1:if t<=20 then goto 10
```

This is largely because the *'goto 10'* doesn't have to be directly executed in the *For ... Next* method.

Some Basics don't require the loop variable to be on the end of the next statement, eg, *'for t=1 to 20.next'* is legal. This is faster than the equivalent *'next t'*. The presence of the loop variable (*t* in the above example) forces the interpreter to check that the *'t'* is the correct variable (to make sure that you haven't crossed loops, etc). If the *t* is absent the interpreter assumes your program is correct.

Some important points arise from considering arithmetic. Multiplication is faster than division and addition is faster than multiplication, so $x * 0.5$ is faster than $x/2$. Likewise a statement like $x * x$ is faster than x^2 ('x to the power of two').

Don't recalculate already known values particularly with functions like SIN, COS, EXP. Save the value in a variable for later use. See the example below.

Also, integer arithmetic is very much faster than real arithmetic. Always use integer variables (eg, x,t) wherever possible, although some Basics like CBM 64 convert all integers to reals anyway and so the above doesn't apply.

On a different tack, when using multiple *IF* statements, put the most likely conditions to occur first in the program, eg:

```
100 if a$ = "n" then goto 1000
110 if a$ = "a" then goto 1100
130 if a$ = "e" then goto 1200
130 if a$ = "w" then goto 1300
```

If, for example, (a$="e") is more likely to happen (a$="n") then swap round the statements on Lines *100* and 120.

It's also worth noting that arrays are slower than non array variables. Very occasionally it is possible to eliminate an array without making the program so complicated that it is even slower. This is true when you always index a particular array using constants and not variables (ie, your references to the array are of the form *a(1)*, *a(12)*, etc rather than *a(t)*, *a(y+1)*, etc.

Finally, putting multiple statements on a line is faster than using separate lines, eg:

```
10 for t = 0 to 100.(body of loop) next t
```

is faster than –

```
10 for t = 0 to 100
20 (body of loop)
30 next t
```

Using these techniques can make a big difference in the performance of the average program. But don't go for speedy programs for their own sake! Implementing many of the above points will cause a program to become less readable and will make it harder to debug or modify, so don't make a program (or a subroutine) fast if speed doesn't matter as is very often the case.

```
FAST

10 pi=4*atn(1):for t=0 to 1 step 0.1

20 area = t * t * pi

30 print "area of circle radius " t "is " area

40 next t

SLOW

10 for t=0 to 1 step 0.1

20 area = t * t * 4 * atn(1)

30 print "area of circle radius " t "is " area

40 next t
```

Stitched together

*Isolate sections of your programs with this routine for the CBM 64 by **Mike Hart***

Have you ever been faced with the following problem having developed a portion of code or a subroutine, you now wish to 'tidy it up' by renumbering it, but your renumber facility also renumbers the rest of the program? Or you may simply wish to save a section of a program or a subroutine to be appended to later programs? What is needed is some way to isolate the section of code you have developed from the rest of the program so that you can subject it to special treatment.

The solution lies in this small machine-code routine written for the CBM 64 called *Code-Isolator* When you call the routine specifying the first and last line of the section of code that you wish to isolate it alters the start and end of Basic pointers so that your machine only 'sees' that portion of code You can now renumber it or save as you wish. Finally, calling another *Sys* routine will 'stitch' the program back together again for you and you now have the finished article.

The code is located in the cassette buffer but is completely relocatable. As it stands, the code occupies locations *s033C-s033B* (828-907 decimal) To isolate the code, we call the entry point (three bytes further on from the start location) using the syntax: *Sys 831,first,second*, where first refers to the start point of the code you wish to isolate, and second refers to the last line

If the lines do not exist, you will get an *Undefined Statement* error Having performed your renumber or what have you, then calling *Sys 887* will stitch the program back together for you.

Relocating the code is simple, if you find that it conflicts with another favourite routine that also occupies the cassette buffer The entry point for the isolation routine is three bytes further on from your new location start address, whilst the stitch routine is called by accessing 59 bytes further on from your new location start address

The routine is generally quite robust, ie, it will cope with the fact that later sections of code are moved down in memory if any *Goto's* in a central 'isolated' section of code are renumbered in such a fashion that this section of code itself becomes longer, eg. *Goto 9* might become *Goto 60009* which obviously occupies more space in the way that the program line is stored However, you should take care in the following case

Any references (eg *Goto's*) in your isolated section of code that jumped beyond the code will not be valid Your *Renumber* routine may renumber them as it now cannot 'see' the rest of your program Be prepared to renumber these by hand.

A detailed disassembly is provided for those who like to see how such routines work and extend their own knowledge of machine code procedures The references to the Rom routines are sA8E3 (Undefined Statement Error), sA96B (input number 0-63999, sA613 (search text for line no), sA533 (rechain lines)

```
1 REM ****  CODE-ISOLATER   ****
2
3 REM   **   M. C. HART     **
4
5 REM SYNTAX SYS 831,---,--- TO ISOLATE
6 REM          SYS 887 TO RE-LINK
7
8 REM ALT. LOC'N+3,---,--- TO ISOLATE
9 REM       LOC'N+59 TO RELINK
10
11 L=820 FOR J=L TO L+79 READ X POKE J,X
12 T=T+X NEXT J
13
14 IF T<>8510 THEN PRINT"ERROR!" END
15
100 DATA 76,227,168,32,115,0,32,107
101 DATA 169,32,19,166,144,242,165,95
102 DATA 166,96,133,43,134,44,169,0
103 DATA 133,2,32,115,0,32,107,169
104 DATA 32,19,166,144,219,160,3,200
105 DATA 177,95,208,251,200,145,95,200
106 DATA 177,95,240,2,230,2,169,0
107 DATA 145,95,96,169,0,160,1,133
108 DATA 44,132,43,32,51,165,160,1
109 DATA 165,2,145,34,32,51,165,96
110
500 PRINT "SEGMENT 1" PRINT
510 REM
520 FOR J=1 TO 5
530 PRINT J
540 NEXT
550 PRINT
560
1000 PRINT "SEGMENT 2" PRINT
1010 REM
1020 FOR J=1 TO 5
1030 PRINT J
1040 NEXT
1050

READY.
```

ORPHEUS PASCAL 64

This is a cassette based implementation for the Commodore 64
The package consists of an editor, compiler and run time interpreter which are loaded into memory from cassette and stay resident in the machine as long as the Pascal is being used.

The language is based on standard Pascal with a number of useful extensions for graphics, sound and joystick control.

Editor Commands
Standard Commodore screen editor +

AUTO	BASIC	CAPSON	CAPSOFF	CHANGE	CLOAD	CSAVE	COLDST
COMP(ILE)	DELETE	DECVAL	FIND	HEXVAL	LIST	NEW	RENUMB
RUN	SPOOL	CONFIG	TEXT				

Standard Constants

FALSE	TRUE	MAXINT

Standard Types

INTEGER	BOOLEAN	REAL	CHAR	TEXT

Standard Files

INPUT	OUTPUT

Standard Functions

ABS	ARCTAN	CHR	COS	EOF	EOLN	EXP	LN
ODD	ORD	PRED	ROUND	SIN	SQR	SQRT	SUCC
TRUNC							

Standard Keywords

AND	ARRAY	BEGIN	CASE	CONST	DIV	DO	DOWNTO
ELSE	END	FILE	FOR	FUNCTION	GOTO	IF	IN
LABEL	MOD	NIL	NOT	OF	OR	PACKED	
PROCEDURE	PROGRAM	RECORD	REPEAT	SET	THEN	TO	TYPE
UNTIL	VAR	WHILE	WITH				

Standard Procedures

GET	NEW	PACK	PAGE	PUT	READ	READLN	RESET
REWRITE	UNPACK	WRITE	WRITELN				

Other Keywords and Extensions

BORDER	CLRCRAYON		CLRPAD	CRAYON	DISPOSE	DRAW	
ENVELOPE	ERASE	FIRE	HIRES	HOURS	INKEY	JOYSTICK	LORES
MINUTES	ONERR	ORIGIN	PAD	PAINT	PAPER	PEEK	PEN
PLOT	POINT	POKE	RANDOM	SECONDS	SETCLOCK	SPLIT	
UNPAINT	VOICE	VOLUME	CLOSE	NEW			

Orpheus Pascal is supplied on cassette with a comprehensive 128 page ring-bound manual
A free update service is available for the latest Pascal information Retail Price £24 95 inc V A.T

Additional packages coming soon.

1. **NCG Pascal:** A conversion tape that allows your Pascal to generate native code (Machine Code) so that compiled programs will run as stand alone programs

2. **Pascal Demo:** A set of programs that fully demonstrate all the features and capabilities of Orpheus Pascal 64

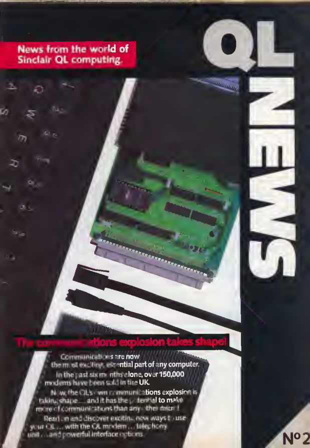
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NEVER LOOK BACK

Orpheus Ltd , Unit 1, Church Farm, Hatley St George, Nr Sandy, Beds
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Name ______ Address ______



News from the world of Sinclair QL computing.
QL NEWS
The communications explosion takes shape!
Communications are now the most exciting, essential part of any computer.
In the past six months alone, over 150,000 modems have been sold in the UK.
Now, the QL's own communications explosion is taking shape… and it has the potential to make more of communications than any other micro!
Read on and discover exciting new ways to use your QL… with the QL modem… telephony unit… and powerful interface options.
Nº2



DAVID KARLIN

Why Q COM is everything you could wish for in communications.

The QL is now communicating – via Q COM! This exciting three-part peripheral presents QL users with a multitude of ways to exploit the world of communications.

Once connected to the QL, Q COM allows you to access the considerable number of phone in databases, such as Prestel and QNet.

Q COM enables you to communicate with other computer users. Its facilities include electronic mail, data transfer from Microdrives and bulletin boards.

Through it you can link your QL to larger minicomputers. Q COM has full capability in this area, and allows the QL to talk to powerful mainframes.

Q COM's automatic dialling and call acceptance facilities, together with the storage of messages from other modems, will revolutionise the way you use your telephone.

The next few pages of QL News tell you much more.

It's enough for me to say here that with the QL and Q COM, you'll be exploring new openings in communications for some time to come!

David Karlin

David Karlin,
Chief Design Engineer

The Q COM package

Three special parts to stack!

QL communications interface

Q CON

This multi-speed interface contains the sophisticated software used to set up QL communications – and to control the Q CALL and Q MOD units.

Q CON also comes complete with Microdrive-based software. This enables the QL to link to larger computers using VT100 and viewdata protocols.

The software will also run *any* standard modem – connected via Q CON's built-in RS-232-C port.

Most importantly, Q CON allows the QL to transmit and receive at rates switchable from 75 to 9600 baud (encompassing the widely used 75/1200 Prestel rates, and 1200/1200 half duplex rates for user to user exchange).

Q CON is specially styled to suit your QL – with similar fluting and ribs – and forms the base module of a vertical stacking system.

It's supplied with full instructions, software on Microdrive cartridge and connecting leads.

QL auto dial/answer unit

Q CALL

Q CALL gives every QL user something out of the ordinary.

It's a module which links directly to your telephone and allows auto dialling at the push of a single key. In the same way, it will permit incoming calls to be accepted automatically and even trigger pre-programmed activity from the QL!

Q CALL is the central unit of the package. It plugs directly into Q CON – so there are no connecting cables to worry about.

QL modem

Q MOD

Q MOD has all the powerful facilities expected of a modem in a neat and simple unit.

It uses either V23 75/1200 or 1200/1200 baud rates, for Prestel, Micronet 800 and all the viewdata services described alongside.

It also incorporates a telephone extension socket for manual dialling.

Q MOD is the top unit of



Exploring the world of QNet, Prestel, Micronet and more!

Thousands of QL users already enjoy the excitement of linking to a nationwide mainframe

Q COM turns your QL into an intelligent terminal, allowing you to access many thousands of pages of information, software and communications facilities.

The services brought to you through Prestel can include Micronet 800 Viewfax 258 and QNet, the new QL database

Membership of QNet will bring you free software QL news and features, and all the wide-ranging services of viewdata!

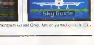
If armchair shopping is more your style that's easy too It's often possible to place a direct order using your QL! For dedicated QL owners, there's a daily selection of software reviews, chart toppers and all the facts and figures you need to make buying peripherals simple

With Q COM you can also 'download' software from the system directly into your QL and either use it immediately, or store it on Microdrive cartridge.

In fact the only problem you'll face with a viewdata service is finding enough time to explore its many features!

You can find out how to join QNet by phoning 01 278 3143







News [illegible] banking services and QNet. And only a fraction [illegible] new viewdata capability

Q COM, and comes with a 9 built-in telephone cable.

All three units are available from Sinclair on (0276) 685311 and from selected Sinclair stockists.

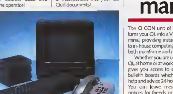
The QL hooked on voice and data

The QL can now act as your personal address book and telephone operator!

Q COM allows you to store hundreds of personal or business numbers.

You can store lengthy passwords and account numbers – and recall them – at the touch of a single key

And any information that's sent to you from other modem-owners can be gathered and stored on Microdrive cartridge, or incorporated into your QL Quill documents!



QL meets the mainframes!

The Q COM unit of Q COM turns your QL into a VT100 terminal, providing instant access to in-house computing services, both mainframe and mini.

Whether you are using your QL at home or at work, Q COM gives you access to electronic bulletin boards which provide help and advice 24 hours a day You can leave messages or notices for friends or business contacts and even hold live discussions with them

Additional benefits for the QL business user include easy access of in-house company software and the interrogation of other data bases around the country

There's also the opportunity of linking to British Telecom Gold – the widely-publicised and popular messaging service.

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QL Hardware

Microdrive cartridge price cut to only £1.99!


Sinclair Microdrive cartridges – up to 100K of programs and data on a medium so compact you can pop it into your pocket.

On February 1, the cost of Microdrive cartridges came down from £4.95 to £1.99 each.

Microdrive cartridges are the QL's own unique storage medium. Each stores up to 100K of information (that's 40 pages of A4 text) on a cartridge no bigger than a book of matches!

Over 500 000 cartridges are now being used throughout Britain.

You can store up to 50 different data files per cartridge, identified by titles of your own choice.

And QL Microdrives themselves are standard equipment on the new ICL One Per Desk micro, and British Telecom's new Merlin Tonto.

IEEE-488... the instrument connection

IEEE-488 is the interface standard set by the Institute of Electronic and Electrical Engineers for instrumentation control.

IEEE 488 – or General Purpose Instrumentation Bus – is a parallel interface specifically designed for high speed data transfer between a number of different types of device.

It is commonly used for controlling instrumentation via a computer allowing the creation of laboratory data acquisition systems, industrial control schemes, etc.

The QL now has a fully fledged IEEE-488 interface from CST. It plugs neatly into the QL's RAM expansion port, and can control up to 16 instruments simultaneously.

It's available from CST on (0223) 323302.

An IEEE-488 interface slips discreetly into place.

New inte[rface] 3½" or 5¼"

With new Q-Disk, you can transform the QL into a powerful small business system – comprising QL, monitor, disk interface, twin disk drives and printer.

Q-Disk upgrades the QL to disk storage. Fitting easily into the QL's left hand RAM expansion port, without the need for a special expansion box, it contains a Western Digital disk controller chip. Software is held in an on-board EPROM (so little of the QL's RAM is used).

Plug in Q-Disk, and the QL accepts one or two disk drives, sized 3 in, 3½ in, 5¼ in, either 40 or 80 track, single or double-sided. Even when two drives are used, they can be different types!

Q-Disk offers up to 16 Mbytes of quick, reliable storage with a compatible disk drive.

It's made by Computamate, who also offer a full range of



QL to link students

Strathclyde University, in Glasgow plans to have a campus network of 7,000 QLs linked to a central VAX minicomputer.

That's one QL for every student – a major investment project in a university which is now a leading centre for artificial intelligence work.

Sinclair is giving support worth £250 000 to the project. And it's likely that QL users everywhere will benefit – the students plan to develop AI programs to run on the QL!

The QL has impressed Prof James Alty of the University's Computer Science Department, who says *'only the QL could offer the computing power, range of applications, and above all the portability, at a realistic price.'*

face to connect 3", disk drives

complimentary QL disk drives.

To contact Computamate, phone (0782) 811711.

Single disk unit fitted with 5¼ inch drives and *(inset)* the QL Disk controller

The QL's high-tech spec

Dimensions
138 x 46 x 472mm
(5⅜" x 1⅞" x 18⅝")

Weight
1388 gms (3 055 lbs)

RAM
Massive 128K standard RAM, externally expandable to 640K. Extra RAM is available in 64K, 128K, 256K and 512K units from third-party suppliers.

ROM
48K, containing Sinclair SuperBASIC and the Sinclair Qdos operating system.

CPU
Motorola 68008 (running at 7.5 MHz) for all principal functions. (Architecturally the 68008 is a 32-bit processor with an eight-bit data bus. One megabyte of non-segmented address space is available.)

In addition, an Intel 8049 controls the keyboard, generates the sound, and acts as an RS-232 C receiver.

Operating system
Qdos (developed by Sinclair Research) is a single-user multi-tasking, time sliced system using Sinclair SuperBASIC as a command language with display handling for multiple screen windows, and device-independent input-output.

Language
Sinclair SuperBASIC, with the advantages of procedure structuring, extendability (including syntax), interpretation speed independent of program size, clean machine code interface, operating system facilities accessible from SuperBASIC, equal capability for strings and arrays and full error-handling facilities.

Microdrives
The QL incorporates twin QL Microdrives, each with a minimum 100K capacity, 3.5 seconds average access time. Typical loading rate of machine code programs is 2-3K per second.

Video
High resolution graphics capability with colour or monochrome monitor (or TV) in two modes – 512 x 256 pixels (four colours available) and 256 x 256 pixels (eight colours available). Normal character display format of up to 85 x 25 with choice of character sets available (TV format of up to 40 to 60 columns depending on the software).

Keyboard
Full-size 65-key QWERTY keyboard featuring a space bar, left- and right-hand shift keys, five function keys and four cursor control keys. The keyboard can be angled by means of detachable feet.

Expansion
Excluding RGB monitor, power socket and TV port, eight peripheral/expansion ports are provided – one internal expansion, one Microdrive expansion, one ROM cartridge, two serial and two control channels and the local area network.

Serial
Two standard RS-232-C communications interfaces for printers, modems, etc. Transmission at rates from 75-19200 baud or full duplex transmit/receive at seven rates up to 9600 baud.

LAN
For up to 64 QL computers. Data transmission over the net can be achieved at 100K baud.

Power supply
9V DC at 1.8A, 15.6V AC at 0.2A.

Joysticks
Provision for one or two devices for games or cursor control.

Applications Software
QL Quill – word processor
QL Abacus – spreadsheet
QL Easel – graphics
QL Archive – database
All four packages supplied with the QL.

Price
£399 including VAT, QL programs, full A4 manual, power supply, 4 blank cartridges and free Helpline service.

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QL Software

Updated versions of Psion software now available!

QL Abacus, Archive, Easel and Quill are the four Psion programs supplied with every QL. They're now converted to 100% machine code, and as a result they load from Microdrive cartridge much faster.

The overlays present in Version One software have been removed, resulting in noticably quicker on-screen performance.

With the compactness of machine code, there's a big saving in QL memory too – all four programs now cope with larger, more professional applications!

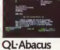
Version Two software is now supplied with every new QL. Existing QLUB members – see back page.

QL·Quill

QL Quill makes it easy to type in correct and store your letters, memos and reports.

No training is needed – a beginner can be using QL Quill for word-processing within minutes!

QL Quill has the facilities of professional word processing packages including word wrap search and replace, justification page headers and footers.



QL·Easel

QL Easel allows you to create graphs, bar charts and pie charts – at the touch of a key.

The program handles any thing from lines and shaded curves to overlapping or stacked bars.

QL Easel designs and scales automatically or under your control. Text can be added and altered as simply as data.

QL·Abacus

QL Abacus is a powerful, yet easy-to-use spreadsheet.

The program allows you to manipulate the contents of whole rows and columns by the names you assign them. There's no need to depend on confusing letters and numbers.

QL Abacus also incorporates a range of functions which let you carry out rapid 'what if' analyses on your data.

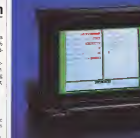
QL·Archive

QL Archive is a sophisticated, powerful database program.

It includes a screen editor which allows you to design your own screen and format your reports, and a procedure editor which lets you tailor QL Archive to your own requirements.

QL Archive is ideal for all database uses, yet it's powerful enough to be used by many software houses to generate specific database applications.

Non-members of QLUB can purchase new versions of the above software for £15 per title, or £50 for all four programs. Phone (0276) 686100 for details.



QL Entrepreneur, QL Project Planner and QL Decision Maker from Sinclair

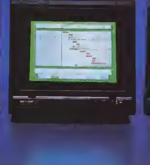
Coming soon- QL·Entrepreneur, QL·Project Planner, QL·Decision Maker!

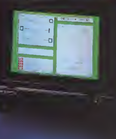
Three new QL business programs – with a difference!

QL Entrepreneur, QL Project Planner and QL Decision Maker train you to apply new and exciting management skills – through original and powerful means!

An interactive teaching program gives you a thorough and enjoyable understanding of each subject – backed by a text-book and 'self-test' facilities - and an applications program helps you to use your new expertise for specific problems and projects.

All three titles will increase your understanding and extend your control – making involved subjects easy, stimulating and useful!







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QL· Project Planner
Software by Triptych Publishing Ltd

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QL· Decision Maker
Software by Triptych Publishing Ltd

QL·Entrepreneur

QL Entrepreneur is an essential program for anyone preparing to start a new business – whatever it may be!

It uses a 'question and answer' format to help you build a workable business plan.

With the input you give, it works out the break-even point of the business, the first 18 months' cash flow the type of finance needed the year end Balance Sheet and Profit and Loss accounts and more!

QL Entrepreneur builds your skills and techniques.

It's flexible too so that you can ask complex 'what if' questions at any stage!

The program comes with a third, blank Microdrive cartridge and a comprehensive A5 manual.

QL·Project Planner

QL Project Planner will produce plans you can understand, monitor and more easily achieve.

First, you break the project down into its individual activities, telling QL Project Planner how long each takes and which are inter-dependent.

When you decide on a starting time/date QL Project Planner will tell you when each activity must start and finish and when the project will be completed.

Each activity is divided into its critically important stages – those which can safely be moved around without altering the time taken by the project and those where movement will affect the completion deadline

Whether or not you've used project planning systems before, you'll be amazed at the difference QL Project Planner can make.

The program comes with a third, blank Microdrive cartridge and a comprehensive A5 manual.

QL·Decision Maker

Whether you're thinking of buying a house, or taking on a new business contract, QL Decision Maker makes the choices clearer!

It lets you look at the possibilities – and their implications – through a decision tree

Once you've set out the decisions and their probable costs or results, QL Decision Maker shows the outcomes which would occur from each particular route.

You can see how much money a decision could make for you ... or cost you Complex 'what if' questions are dealt with swiftly and graphically

You can depend on the QL to highlight the best possible route!

QL Decision Maker comes with a third blank Microdrive cartridge and a comprehensive A5 manual.

All three programs are available from Sinclair stockists, price £39.95 each, or Sinclair Research. Tel (0276) 686100

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QL NEWS

Now, buy a QL and you're a member of the QLUB-free!

QLUB is the special Users Bureau for Sinclair QL owners

Already, there are well over 10,000 QLUB members enjoying a whole range of information and advisory services.

Until now, joining QLUB cost £35 per year. From March 4, every new QL owner can become a member – free of charge!

With your new QL, you'll find a post-paid form Complete and mail it, and you'll soon be a member of the fastest growing computer club in the country

And you'll enjoy all the helpful services listed here!

What QLUB membership offers you

Regular newsletters delivered to your door

One of the most important QLUB benefits is the special news magazine appearing six times a year The magazine provides a forum for QL owners to exchange views and keep in touch with all the latest developments.

Each issue is packed with updates on QL hardware and software tips on applying the four QL programs and news of how other people are using the QL.

Special discounts

QLUB members also receive a range of special discounts, with savings of at least 20% on selected software products.

There are also special subscription rates for Personal Computer News and QL User

Free Helpline service from Psion

All QLUB members are entitled to 12 months special assistance from Psion

They're at the end of the telephone to answer any questions on using the QL Abacus, Archive, Easel and Quill programs supplied with the computer

Help is also available on any aspect of using Sinclair SuperBASIC, Qdos, or linking your QL with major peripherals.

Psion will normally answer any queries within 48 hours

QL program updates are no longer available free to QLUB members. They will be sold separately

Good news for existing QLUB members too!

As one of the first members of QLUB you should already have received one *free* update of each of the four QL programs – and a letter with your new membership details

If for any reason you haven't, you should ring (0276) 686100

You're a QL owner, but not a QLUB member?

Then joining QLUB is easy and free! Ring (0276) 685311 for full details You can be a full QLUB member within a few days.

Where to find the QL

The Sinclair QL is available at selected branches of Dixons, WH Smith, John Lewis Partnership, Currys. Greens in Debenhams and Ultimate, and larger branches of Boots, John Menzies and specialist computer stores nationwide.

Sinclair Research Ltd
Camberley, Surrey GU15 3BR.
Tel Camberley (0276) 686100

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Automatic drive

Loading made easier from microdrive with this routine for the Spectrum 48K by **Robert Kirkland**

This is a utility program for Spectrum users with microdrives. I often found that when I wanted a program from a microdrive cartridge I first had to do a catalogue to check the exact name of the program which I had saved previously. Then I would load it using Sinclair's very long winded *Load* command.

This program prints out all of the programs on a cartridge and all you do is enter the number next to the program you wish to load, and it will be loaded automatically. The program is saved with the filename "*run*" on power up or after a *new* command, then the program will load and run automatically.

This sounds fairly simple but it is very difficult to get it down to an acceptable time to do this. This is how the program works.

The *Cat* command can be used to send the catalogue to an imaginary file "*cat*" on microdrive. Then a *Cat* command is executed, sending the information to Stream 4, Line 25. This information is not actually put on to the microdrive until a *Close#4* command is executed. During that time it is held in a microdrive channel.

The program then uses a machine code routine to find this information and print it on to the screen. An assembly listing of this program is given in Listing Two. The filenames are then printed in two columns allowing 42 to be printed.

Lines 90-140 decide which column to print in. 150-180 see if all have been printed, 170-380 print the number given to the filename, 390-400 print a right hand bracket, 410-490 print the filename.

The *Clear#* command is then used to clear the channel data. When you enter the number of the program to be loaded then the program finds the position of the filename on the screen and builds up the name in a$, *120-180*. Then the program or code is loaded.

The program must use microdrive number 1 and code must be saved with a # sign at the end of the filename.

Basic – List 1

```
  10 PRINT AT 10,9; FLASH 1; INK
 1; PAPER 6;"JUST A MOMENT"
  15 CLEAR #
  20 OPEN #4,"M",1,"cat"
  25 CAT #4,1
  30 RESTORE
  40 CLEAR 63999
  60 INK 6: PAPER 1: CLS
  65 GO SUB 800
  70 PRINT AT 3,5; FLASH 1;"PROG
RAMS ON CARTRIDGE"
  80 LET l=USR 64000
  90 CLEAR #
 100 INPUT "Which program to loa
d ",p
 110 IF p>=l OR p<1 THEN BEEP .5
,10: GO TO 100
 120 LET t=p-(21*(p>21))
 130 LET i=5+14*(p>21)
 140 LET a$=""
 145 LET c=0
 150 FOR j=0 TO 9: LET b$=SCREEN
$ (t,i+j): LET a$=a$+b$: IF b$="
$" THEN LET c=1
 160 NEXT j
 165 CLS #
 170 IF c THEN GO TO 200
 180 LOAD *"m";1;a$
 190 STOP
 200 LOAD *"m";1;a$CODE
 210 CLEAR 30000
 220 NEW
 799 STOP
 800 FOR j=64000 TO 64071: READ
a: POKE j,a: NEXT j: RETURN
 810 DATA 62,2,205,1,22,33,130,9
3,22,1,30,3,14,1,122,254,22,32,4
,22,1,30,17,126,254,13,200,62,22
,215,122,215,121,254,10,56,4,123
,61,24,1,123,215,197,213,229,6,0
,205,40,45,205,227,45,225,209,19
3,62,41,215,6,10,126,215,35,16,2
51,35,20,12,24,196
 900 REM SAVE PROGRAM
 910 POKE 64000,237
 920 POKE 64001,49
 930 POKE 64002,201
 940 RANDOMIZE USR 64000
 950 POKE 23791,4
 960 SAVE *"M";1;"run" LINE 1
```

Assembler – List 2

```
10          ORG   64000
20          ENT   $
30          LD    A,2
40          CALL  $1601
50          LD    HL,23938
60          LD    D,1
70          LD    E,3
80          LD    C,1
90   L1     LD    A,D
100         CP    22
110         JR    NZ,L4
120         LD    D,1
130         LD    E,17
140  L4
150  L2     LD    A,(HL)
160         CP    13
170         RET   Z
180         LD    A,22
190         RST   16
200         LD    A,D
210         RST   16
220         LD    A,C
230         CP    10
240         JR    C,L5
250         LD    A,E
260         DEC   A
270         JR    L6
280  L5     LD    A,E
290  L6     RST   16
300         PUSH  BC
310         PUSH  DE
320         PUSH  HL
330         LD    B,0
340         CALL  $2D28
350         CALL  $2DE3
360         POP   HL
370         POP   DE
380         POP   BC
390         LD    A,41
400         RST   16
410         LD    B,10
420  L3     LD    A,(HL)
430         RST   16
440         INC   HL
450         DJNZ  L3
460         INC   HL
470         INC   D
480         INC   C
490         JR    L1
```

Music while you work

Background music on your BBC B with the aid of
Philip Whitehead

This programme will play a tune held in memory continuously, while it carries out other tasks, like listing a program, or loading from tape It can be used to produce background music to liven up games, or to relieve boredom while loading a long program from tape The program is totally transparent to the user, is totally machine code and takes up less than 256 bytes of memory (plus the memory used by the data for the music)

To create the interrupts, the interval timer event, generated by the interval time when it crosses zero, is used to call the machine code routine every twentieth of a second The machine code then calls an *Osbyte* routine to see if the sound channel is clear. If it is, it reads the next note out of the table, else it jumps to the next sound channel. Channels may be enabled or disabled by the setting of various flags in zero page Notes are stored in the following form. length in twentieths of a second, followed by frequency of the note

Zero page locations *&70-&77* are used to point to the 4 possible tables, two bytes for each sound channel. If *&FF* is stored in the high byte, the code considers that channel disabled. *&78-&7F* are used to point to the note being read at present, two bytes for each channel *&8C-&8F* are used to to store the envelope in use for each sound channel. *&100-&107* are used as a parameter block for the *Osword* command which stimulates the sound command in Basic *&108-&10C* are used as a parameter block for the set interval timer *Osword* call. To signal the end of the music data for a particular channel, *&FF* is written into the length byte This is followed by the envelope to be changed to Normally, a piece of music will start with this code, in order to initialise the sound to be used by the music A 'rest' can also be created by setting the envelope value to zero, and issuing a sound of the required length, which will now have a volume level of zero amplitude

Plenty of Rem statements have been used, to make the program easier to understand The machine code section has been extensively annotated with descriptions of each section, in order to give a chance for anyone with a knowledge of machine code to adapt it for their own purposes

In order to convert music to numbers, read the sound section in the user guide It contains all the information for converting notes on the music scale into numbers which the routine can use

The program has been renumbered, and so may easily typed in by using the *Auto* command. The program is versatile, and can easily be adapted to many uses Note '£' in the listing should be entered as '#'

Program Notes

Line No

10-120 – Calls procedures & initialises events

130-550 – Data for demonstration music

560-830 – *Procsetup* sets up envelopes to be used, parameter blocks memory positions of data tables, and reads in the music data from the Data statements.

840-1510 – Machine code section.

Zero page useage

&70,&71 – memory position of channel 0 data (can be used as percussion)

&72,&73 – memory position of channel 1 data

&74 &75 – memory position of channel 2 data

&76,&77 – memory position of channel 3 data

&78-&7F – used as two byte pointers to present note being read from each channel

&80 – used by machine code to point to channel being read (multiples of 2)

&81 – used by machine code to represent channel number (has ½ the value of &80)

&8C-&8F – present envelope to be played for particular channel

```
 10REM Interrupt driven music
 20REM By P.D.whitehurst
 30PROCassemble_code
 40PROCsetup
 50REM Clear buffers
 60*FX15,0
 70REM Initialise pointers and
 80REM set up interval timer
 90CALLinitialise
100REM Start events
110*FX14,5
120END
130REM *** Data for demo music ***
140DATA254,1:REM set envelope 1
150DATA15,69,5,77,10,89
160DATA20,105,10,105
170DATA10,105,10,97,10,89
180DATA5,97,15,89,10,77
190DATA15,69,5,77,10,89
200DATA20,105,10,105
210DATA10,105,10,97,10,89
220DATA10,97,15,89,5,77
230DATA15,69,5,77,10,97
240DATA30,89
250DATA254,1
260DATA10,69,15,89,5,77
270DATA5,69,20,57,5,69
280DATA10,89,10,105,10,97
290DATA30,89
300DATA10,77,10,89,10,85
310DATA5,77,20,69,5,61
320DATA10,69,15,89,5,77
330DATA30,69
340DATA10,69,15,89,5,77
350DATA5,69,20,57,5,69
360DATA10,89,10,105,10,97
370DATA15,89,5,97,5,105,10,109
380DATA15,105,5,97,10,89
390DATA15,77,5,69
400DATA15,69,5,77,10,97
410DATA30,89
420DATA255,255
430REM accompanyment
440DATA254,2:REM set envelope 2
450DATA60,41,60,61,60,41,60,61,60,41
460DATA120,41,60,61,175,41
470DATA60,61,15,69,15,69
480DATA30,41
490DATA255,255
500DATA254,2:REM set envelope 2
510DATA60,69,60,77,60,69,60,77,60,69
520DATA120,69,60,77,175,69
530DATA60,77,15,37,15,37
540DATA30,69
550DATA255,255
560DEFPROCsetup
```

```
570 REM **Initialise sound params**
580[illegible]
590 REM **parameter block for timer**
600[illegible] C?FF
610ENVELOPE1,1,1,1,-1,1,2,1,127,-2,0,2,[illegible]
620ENVELOPE[illegible],1,-1,50,0
630[illegible]=&FF:REM Disable channel 0
640 REM Set areas for music data
650[illegible]?&73=&2F
660[illegible]?&75=&2F
670[illegible]?&77=&2F
680 REM *Read data for channel 1**
690C%=0:REPEAT
700READA%:C%?&2F00=A%
710READA%:C%?&2F01=A%
720C%=C%+2:UNTILA%=&FF
730REM *Read data for channel 2**
740C%=0:REPEAT
750READA%:C%?&2FA0=A%
760READA%:C%?&2FA1=A%
770C%=C%+2:UNTILA%=&FF
780REM *Read data for channel 3**
790C%=0:REPEAT
800READA%:C%?&2FD0=A%
810READA%:C%?&2FD1=A%
820C%=C%+2:UNTILA%=&FF
830ENDPROC
840DEFPROCassemble_code
850osword=&FFF1
860osbyte=&FFF4
870FORPASS=0TO2STEP2
880P%=&A00
890[OPT PASS
900.event PHA:TXA:PHA:TYA:PHA
910LDX£8:LDY£1:LDA£4:JSRosword
920LDA£0:STA&80
930.loop
940LDA&80:LSRA:STA&81:CLC
950ADC£4:TAX:LDA£&98
960JSRosbyte  \ is channel free?
970BCScont:JMPendloop
980.cont LDY&80:LDA&70,Y:STA&82
990LDA&71,Y:STA&83
1000CMP£&FF:BEQendloop
1010LDA&78,Y:CLC:ADC&82:STA&82
1020LDA&79,Y:ADC&83:STA&83
1030LDY£0:LDA(&82),Y
1040CMP£&FF     \ equal to &FF?
1050BNEnotend   \ if not,continue
1060LDA£0
1070STA&78,Y    \ reset pointer for
1080STA&79,Y    \ this channel
1090JMPloop     \ read first note
1100.notend
1110CMP£&FE     \ equal to &FE?
1120BNEsound    \ if not,skip
1130\  increment pointers by 1 note
1140LDA&78,Y:CLC:ADC£2:STA&78,Y
1150LDA&79,Y:ADC£0:STA&79,Y
1160LDY£1
1170LDA(&82),Y \ read envelope number
1180LDY&81
1190STA&8C,Y    \ store in table
1200JMPloop     \ read next note
1210.sound
1220\ set up sound parameter table
1230\ to play correct sound
1240LDA&81:STA&100
1250LDY£0:LDA(&82),Y:STA&106
1260LDY£1:LDA(&82),Y:STA&104
1270LDY&81:LDA&8C,Y:STA&102
1280LDX£0:LDY£1:LDA£7
1290JSRosword  \ play note
1300LDY&80
1310\  increment pointers by 1 note
1320LDA&78,Y:CLC:ADC£2:STA&78,Y
1330LDA&79,Y:ADC£0:STA&79,Y
1340.endloop
1350LDA&80:CLC
1360ADC£2:STA&80 \ next channel
1370CMP£8:BEQreturn:JMPloop
1380.return PLA:TAY:PLA:TAX:PLA:RTS
1390.initialise
1400\ set interval timer
1410LDX£8:LDY£1:LDA£4:JSRosword
1420\ set pointers to zero
1430LDA£0:LDY£7
1440.clear STA&78,Y
1450DEY:BPLclear
1460RTS
1470]:NEXT
1480REM Initialise event vector (&220)
1490?&220=event MOD 256
1500?&221=event DIV 256
1510ENDPROC
```



Paint it black

A machine-code screen dump for the Dragon 32 and CGP 115 printer/plotter **by A Jones**

This program was designed for use with a Dragon 32 and a Tandy CGP 115 Plotter/Printer and similar printers

I have seen Basic programs that do this job but they seem to take a long time to produce a screen dump

This program produces a copy of the high resolution black and white display with the background cleared to white and the actual picture in black to reproduce a faithful copy I have also included instructions to reverse a display if the screen is a black background and the picture foreground is white, otherwise the pen would soon be exhausted

The program produces a copy of twice the pixel size of the screen along the length of the plotter's paper. It also scans a line to check there are no points set on the current line to save time

The program was developed on Dragon's All Dream Editor Assembler, of which a listing of the plot program is included I have also produced a Basic listing for those without an assembler which will save the machine code on tape if the instructions are followed.

When the machine code program is saved and required for use from switch on, type *Clear 200,&H7E00* and press *Enter* Then *CLoadM"PLOT"* and press *Enter* to load

Use *Exec &H7E01* to use the plot program. If it is required to plot from a black background before executing the program, type *Poke &H7E48,&H27 POKE &H7E68,&H27 POKE &H7E8D &H27*

```
4E21                &----SCREEN DUMP TO CGP-115----&
4E21                &----FROM PMODE 4 PCLS5 -------&
7E01  7E01                 ORG #7E01
7E01                       PUT #4E21
7E01 202A                  BRA BEGIN
7E03 4A2D322C30 DRAW1  FCC 'J-2,0'    ,DEFINE PEN
7E08 0D00              FCC #D,#00     ;MOVEMENTS.
7E0A 522D322C30 MOVE1  FCC 'R-2,0'
7E0F 0D00              FCC #D,#00
7E11 4A322C30   DRAW2  FCC 'J2,0'
7E15 0D00              FCC #D,#00
7E17 52322C30   MOVE2  FCC 'R2,0'
7E1B 0D00              FCC #D,#00
7E1D 52302C2D31 SHIFT  FCC 'R0,-1'
7E22 0D00              FCC #D,#00
7E24 523432302C START  FCC 'R420,'
7E29 300D              FCC '0',#D
7E2B 00                FCC #00
7E2C            AND    RMB 1          SAVE A BYTE
7E2D            &-------------------------------
7E2D 8612       BEGIN  LDA #10        ,SET GRAPHIC
7E2F BDBCF5            JSR #BCF5      ,MODE
7E32 CE7E24            LDU #START     ,PUT PEN TO
7E35 BD7EC2            JSR PRINTR     ,START
7E38 8E0600     FIN1   LDX #0600      ,START BYTE
7E3B 8680       REPD   LDA #80        ,SET'AND'BYTE
7E3D B77E2C            STA AND
7E40 5F         NEXTB  CLRB           CLEAR 'B
7E41            &--TEST IF LINE CLEAR-----------
7E41 3410              PSHS X         ,SAVE 'X'
7E43 A684       NEXT   LDA ,X         ,GET A BYTE
7E45 847E2C            ANDA AND       ,STRIP BITS
7E48 2605              BNE SET        ,BRANCH IF 1
7E4A 3510              PULS X         ,RESTORE 'X'
7E4C 5F                CLRB           CLEAR 'B
7E4D 2014              BRA LOOP1      ,CONTINUE
7E4F 5C         SET    INCB           ,ADD 1 TO 'B'
7E50 C1C0              CMPB #C0       ;ALL CLEAR?
7E52 2705              BEQ CLR        ;ALL DONE.
7E54 308820            LEAX 32,X      ,NEXT BYTE
7E57 20EA              BRA NEXT       ,NEXT BYTE
7E59 3510       CLR    PULS X         ,RESTORE 'X'
7E5B CE7E1D            LDU #SHIFT
7E5E BD7EC2            JSR PRINTR     ;SHIFT PAPER,
7E61 2042              BRA FINM2      ,NEXT ROW.
7E63            &--CONTINUE WITH PLOT ----------
7E63 A684       LOOP1  LDA ,X         ,GET A BYTE
7E65 847E2C            ANDA AND       ,STRIP BIT
7E68 2608              BNE NPLOT1
7E6A            &--PEN MOVING LEFT--------------
7E6A CE7E03            LDU #DRAW1     ,PLOT A BIT
7E6D BD7EC2            JSR PRINTR
7E70 2006              BRA FIN2
7E72 CE7E0A     NPLOT1 LDU #MOVE1     MOVE A BIT
7E75 BD7EC2            JSR PRINTR
7E78            &--FINISHED PLOT OR MOVE--------
7E78 5C         FIN2   INCB           INC COUNTER
7E79 C1C0              CMPB #C0       ,ALL DONE?
7E7B 2705              BEQ FINM1
7E7D 308820            LEAX 32,X
7E80 20E1              BRA LOOP1      ,DO AGAIN
7E82            &--FIRST PLOT DONE--------------
7E82            &--SHIFT PAPER------------------
7E82 CE7E1D     FINM1  LDU #SHIFT     ,SHIFT PAPER
7E85 BD7EC2            JSR PRINTR
7E88            &--PEN MOVING RIGHT-------------
7E88 A684       LOOP2  LDA ,X         ,GET A BYTE
7E8A B47E2C            ANDA AND       ,STRIP BIT
7E8D 2608              BNE NPLOT2
7E8F CE7E11            LDU #DRAW2     ,PLOT A BIT
7E92 BD7EC2            JSR PRINTR
7E95 2006              BRA FIN3
7E97 CE7E17     NPLOT2 LDU #MOVE2     ,MOVE A BIT
7E9A BD7EC2            JSR PRINTR
7E9D            &--FINISHED PLOT OR MOVE--------
7E9D 5A         FIN3   DECB           DEC COUNTER
7E9E 2703              BEQ FINM2      ,ALL DONE?
7EA0 3088E0            LEAX -32,X     ,NEXT BYTE
7EA3 20E3              BRA LOOP2      ,DO AGAIN
7EA5            &--SECOND PLOT DONE-------------
7EA5            &--SHIFT PAPER------------------
7EA5 CE7E1D     FINM2  LDU #SHIFT     ,SHIFT PAPER
7EA8 BD7EC2            JSR PRINTR
7EAB            &--NEXT ROW OF PIXELS-----------
7EAB 747E2C            LSR AND        ,ALL 8 DONE?
7EAE 2690              BNE NEXTB      ,DO AGAIN.
7EB0 3001              LEAX 1,X       ;NEXT BYTE.
7EB2 8C0620            CMPX #0620     ,ALL DONE?
7EB5 2684              BNE REPD       DO AGAIN.
7EB7            &--FINISHED---------------------
7EB7 8641       RESET  LDA #'A        ;RESET TEXT
7EB9 BDBCF5            JSR #BCF5      ,MODE
7EBC 860D              LDA #0D
7EBE BDBCF5            JSR #BCF5
7EC1 39                RTS
7EC2            &--SEND TO PRINTER ROUTINE------
7EC2 A6C0       PRINTR LDA ,U+
7EC4 2705              BEQ FINS
7EC6 BDBCF5            JSR #BCF5
7EC9 20F7              BRA PRINTR
7ECB 39         FINS   RTS
7ECC
```

```
10 CLEAR200,&H7E00
20 REM EXAMPLE PROGRAM
30 PMODE4.PCLS5:SCREEN1.1
40 FOR A=50 TO 100
50 CIRCLE(40+A,96),A/1.5,0
60 NEXT A
70 EXEC &H7E01
```

```
5 REM DRAGON SCREEN DUMP TO CGP 115
10 CLEAR200,&H7E00
20 CLS(3).PRINT@120,"LOADING DATA."
30 FOR A=&H7E01 TO &H7ECB
40 READ A$:B=B+VAL("&H'+A$)
50 POKE A,VAL("&H"+A$)
60 NEXT
70 IF B<>19526 THEN PRINT"DATA ERROR,PLE
ASE CHECK.":END
80 PRINT"CODE IS IN POSITION."
90 PRINT@224,"POSITION TAPE IN RECORDER
AND"
100 PRINT@288,"SET TO RECORD,THEN PRESS
ENTER."
110 IF INKEY$=""THEN 110
120 CLS3:PRINT@128,'SAVING PROGRAM.'
130 CSAVEM"PLOT",&H7E01,&H7ECB,&H7E01
140 CLS3:PRINT@128,"PROGRAM SAVED.'
150 DATA 20,2A,4A,2D,32,2C,30,D,0,52,2D,
32,2C,30,0,0,4A,32,2C,30,D,0,52,32,2C,30
,D,0,52,30,2C,2D,31,D,0
160 DATA 52,34,32,30,2C,30,D,0,0,86,12,8
D,8C,F5,CE,7E,24,8D,7E,C2,8E,6,0,86,80,8
7,7E,2C
170 DATA 5F,34,10,A6,84,84,7E,2C,26,5,35
,10,5F,20,14,5C,C1,C0,27,5,30,88,20,20,E
A
180 DATA 35,10,CE,7E,1D,BD,7E,C2,20,42,A
6,84,84,7E,2C,26,8,CE,7E,3,8D,7E,C2,20,6
190 DATA CE,7E,A,BD,7E,C2,5C,C1,C0,27,5,
30,88,20,20,E1,CE,7E,1D,8D,7E,C2,A6,84
200 DATA B4,7E,2C,26,8,CE,7E,11,BD,7E,C2
,20,6,CE,7E,17,BD,7E,C2,5A,27,5,30,88,E0
210 DATA 20,E3,CE,7E,1D,8D,7E,C2,74,7E,2
C,26,90,30,1,8C,6,20,26,84,B6,41,8D,8C,F
5
220 DATA 86,D,8D,BC,F5,39,A6,C0,27,5,BD,
8C.F5,20,F7,39
```



Second deal

*Part Two of last week's Star Game for the CPC 464, Poker by **Terry O'Neil***

Have you got aching fingers? Strained brain? Then you've probably been busy typing in *Poker* all last week. This week, we present the remainder of the program. Remember, £ signs should be entered as # signs.

Enjoy yourself and don't lose your shirt!

```
197 IF BANK=0 THEN FOR I=1 TO 1000:NEXT:CLS £6:PRINT £6
,PRINT £6," YOU ARE FINISHED ":PRINT £6:PRINT £6," NO M
ORE HERE IN THE BANK":PRINT £6:PRINT £6," TRY AGAIN !!
" FOR I=1 TO 7000:NEXT I:RUN 1,10:GOTO 197
198 PRINT £6:PRINT £6," BANK - £ ",BANK
199 PRINT£6:PRINT £6," PRESS ";:PEN £6,3:PRINT £6," SPA
CE BAR ";:PEN £6,4:PRINT £6:PRINT £6," TO CONTINUE"

200 A$=INKEY$:IF A$<>" " THEN GOTO 203
201 IF A$=CHR$(17) THEN GOTO 200
202 GOTO 200
203 PEN 1:LOCATE 1,12:PRINT"    1       2       3
 4       5 "
204 FOR X=1 TO 5:PEN £X,3:CLS £X:PRINT £X,PACK$,:NEXT X
:FOR Z=1 TO 52:PACK(Z)=0:NEXT Z:CLS £6:GOTO 137
205 END
206 REM ********* DEAL CARD ***********
207 RANDOMIZE TIME
208 CARD=INT(RND(1)*52+1)
209 REM CHECK IF CARD IS ALREADY DEALT
210 IF PACK(CARD)=1 THEN GOTO 208
211 REM FIND SUIT CARD IS IN
212 IF CARD <=13 THEN SUIT=1:PACK(CARD)=1:F=CARD:GOTO 2
16
213 IF CARD <=26 THEN SUIT=2:PACK(CARD)=1:F=CARD -13:GO
TO 216
214 IF CARD <=39 THEN SUIT=3:PACK(CARD)=1:F=CARD -26:GO
TO 216
215 SUIT = 4:PACK(CARD)=1:F=CARD-39
216 IF F>10 THEN GOSUB 225:GOTO 223
217 IF SUIT=1 THEN CARD$=H$(F):PEN £X,3
218 IF SUIT=2 THEN CARD$=C$(F):PEN £X,4
219 IF SUIT=3 THEN CARD$=S$(F):PEN £X,4
220 IF SUIT=4 THEN CARD$=D$(F):PEN £X,3
221 IF F<=10 THEN CLS £X:PRINT£X,CARD$;
222 IF F<=10 THEN FOR T=1 TO 1000:NEXT T
223 V(X)=F:COL(X)=SUIT
224 RETURN
225 REM FIND COLOUR CARD
226 IF F=12 AND SUIT=1 THEN RESTORE 242:GOTO 238
227 IF F=13 AND SUIT=1 THEN RESTORE 251:GOTO 238
228 IF F=11 AND SUIT=1 THEN RESTORE 260:GOTO 238
229 IF F=12 AND SUIT=2 THEN RESTORE 269:GOTO 238
230 IF F=13 AND SUIT=2 THEN RESTORE 278:GOTO 238
231 IF F=11 AND SUIT=2 THEN RESTORE 287:GOTO 238
232 IF F=12 AND SUIT=3 THEN RESTORE 296:GOTO 238
233 IF F=13 AND SUIT=3 THEN RESTORE 305:GOTO 238
234 IF F=11 AND SUIT=3 THEN RESTORE 314:GOTO 238
235 IF F=12 AND SUIT=4 THEN RESTORE 323:GOTO 238
236 IF F=13 AND SUIT=4 THEN RESTORE 332:GOTO 238
237 IF F=11 AND SUIT=4 THEN RESTORE 341:GOTO 238
238 CLS £X:FOR S=1 TO 54
239 READ PAP,PAINT,CAR
240 PAPER £X,PAP:PEN £X,PAINT:PRINT£X,CHR$(CAR);:NEXT
S
241 RETURN
242 DATA 2,3,81,2,3,32,2,3,32,2,3,32,2,3,32,2,3,32
243 DATA 2,3,228,1,3,32,4,3,212,4,3,117,4,3,213,2,3,32
244 DATA 2,3,32,1,3,99,2,4,101,2,4,116,2,4,114,2,4,32
245 DATA 2,4,32,1,4,122,2,4,115,2,3,100,2,4,102,2,4,32
246 DATA 2,4,32,3,1,228,4,3,91,4,3,228,3,1,91,2,4,32
247 DATA 2,4,32,2,4,104,2,3,108,2,4,103,1,4,120,2,4,32
248 DATA 2,4,32,2,4,112,2,4,105,2,4,111,1,3,118,2,3,32
249 DATA 2,3,32,4,3,215,4,3,121,4,3,214,1,3,32,2,3,91
250 DATA 2,3,32,2,3,32,2,3,32,2,3,32,2,3,32,2,3,113
251 DATA 2,3,75,2,3,32,2,3,32,2,3,32,2,3,32,2,3,32
252 DATA 2,3,228,1,3,32,1,3,121,1,3,121,1,3,121,2,3,32
253 DATA 2,3,32,1,3,228,2,4,101,2,4,116,2,4,114,2,4,32
254 DATA 2,4,32,1,4,122,2,4,115,2,4,98,2,4,102,2,4,32
255 DATA 2,4,32,3,1,228,4,3,91,4,3,228,3,1,91,2,4,32
256 DATA 2,4,32,2,4,104,2,4,110,2,4,103,1,4,120,2,4,32
257 DATA 2,4,32,2,4,112,2,4,105,2,4,115,1,3,91,2,3,32
258 DATA 2,3,32,1,3,117,1,3,117,1,3,117,1,3,32,2,3,91
259 DATA 2,3,32,2,3,32,2,3,32,2,3,32,2,3,32,2,3,107
260 DATA 2,3,74,2,3,32,2,3,32,2,3,32,2,3,32,2,3,32
261 DATA 2,3,228,1,3,32,3,1,232,3,1,232,3,1,232,2,3,32
262 DATA 2,3,32,1,3,228,2,4,101,2,4,116,2,4,114,2,4,32
263 DATA 2,4,32,1,4,122,2,4,115,2,4,100,2,4,102,2,4,32
264 DATA 2,3,32,3,1,228,4,3,91,4,3,228,3,1,91,2,4,32
265 DATA 2,4,32,2,4,104,2,4,108,2,4,103,1,4,120,2,4,32
266 DATA 2,4,32,2,4,112,2,4,105,2,4,111,1,3,91,2,3,32
267 DATA 2,3,32,3,1,232,2,1,232,2,1,232,1,3,32,2,3,91
268 DATA 2,3,32,2,3,32,2,3,32,2,3,32,2,3,32,2,3,106
269 DATA 2,4,81,2,3,32,2,3,32,2,3,32,2,3,32,2,3,32
270 DATA 2,4,226,1,3,32,4,3,212,3,1,232,4,3,213,2,3,32

271 DATA 2,3,32,1,3,99,2,4,101,2,4,116,2,4,114,2,4,32
272 DATA 2,4,32,1,4,122,2,4,115,2,3,100,2,4,102,2,4,32
273 DATA 2,4,32,2,4,226,3,4,93,3,4,226,3,4,93,2,4,32
274 DATA 2,4,32,2,4,104,2,3,108,2,4,103,1,4,120,2,4,32
275 DATA 2,4,32,2,4,112,2,4,105,2,4,111,1,3,118,2,3,32

276 DATA 2,3,32,4,3,215,3,1,232,4,3,214,1,3,32,2,4,93
277 DATA 2,3,32,2,3,32,2,3,32,2,3,32,2,3,32,2,4,113
278 DATA 2,4,75,2,3,32,2,3,32,2,3,32,2,3,32,2,3,32
279 DATA 2,4,226,3,1,32,3,1,121,3,1,121,3,1,121,2,3,32
280 DATA 2,3,32,3,4,226,2,4,101,2,4,116,2,4,114,2,4,32
281 DATA 2,4,32,3,4,122,2,4,115,2,4,99,2,4,102,2,4,32

282 DATA 2,4,32,1,4,226,1,4,93,1,4,226,1,4,93,2,4,32
283 DATA 2,4,32,2,4,104,2,4,110,2,4,103,3,4,120,2,4,32

284 DATA 2,4,32,2,4,112,2,4,105,2,4,111,3,4,93,2,3,32
285 DATA 2,3,32,3,1,117,3,1,117,3,1,117,3,1,32,2,4,93
286 DATA 2,3,32,2,3,32,2,3,32,2,3,32,2,3,32,2,4,107
287 DATA 2,4,74,2,3,32,2,3,32,2,3,32,2,3,32,2,3,32
288 DATA 2,4,226,1,3,32,3,0,232,3,0,232,3,0,232,2,3,32
289 DATA 2,3,32,1,4,226,2,4,101,2,4,116,2,4,114,2,4,32
290 DATA 2,4,32,1,4,122,2,4,115,2,4,100,2,4,102,2,4,32

291 DATA 2,3,32,1,4,226,4,1,93,4,1,226,1,4,93,2,4,32
292 DATA 2,4,32,2,4,104,2,4,108,2,4,103,1,4,120,2,4,32
293 DATA 2,4,32,2,4,112,2,4,105,2,4,111,1,4,93,2,3,32
294 DATA 2,3,32,3,4,232,3,4,232,3,4,232,1,3,32,2,4,93
295 DATA 2,3,32,2,3,32,2,3,32,2,3,32,2,3,32,2,4,106
296 DATA 2,4,81,2,3,32,2,3,32,2,3,32,2,3,32,2,3,32
297 DATA 2,4,226,1,3,32,4,3,212,1,3,232,4,3,213,2,3,32
298 DATA 2,3,32,1,3,99,2,4,101,2,4,116,2,4,114,2,4,32
```

```
299 DATA 2,4,?,1,4,122,2,4,115,2,?,100,2,4,102,2,4,32

300 DATA 2,4,32,3,4,229,3,4,92,3,4,229,3,4,92,2,4,32
301 DATA 2,4,32,2,4,104,2,3,108,2,4,103,1,4,120,2,4,32
302 DATA 2,4,32,2,4,112,2,4,105,2,4,111 1,3,118,2,3,32
303 DATA 2,3,32,4,3,215,1,?,232,4,3,214,1,?,32 2,4,92
304 DATA 2,3,32,2,3,32,2,3,32,2,3,32,2,3,32,2,4,117
305 DATA 2,4,75,2,3,32,2,3,32,2,3,32,2,3,32,2,3,32
306 DATA 2,4,229,1,3,32,1,3,121,1,3,121,1,3,121,2,?,32

307 DATA 2,2,32,1,4,229,2,4 101,2,4,116,2,4,114,2,4,32

308 DATA 2,4,32,1,4,122,2,4,115,2,4,98,2,4,102,2,4,32

309 DATA 2,4,32,3,1,229,3,1,92,3,1,229,3,1,92,2,4,32
310 DATA 2,4,32,2,4,104,2,4,110,2,4,103,1,4,120 2,4,32

311 DATA 2,4,32,2,4,112,2,4,105,2,4,111,1,4,92,2,3,32
312 DATA 2,3,32,1,3,117,1,3,117,1,2,117,1,3,32,2,4,92
313 DATA 2,3,32,2,3,32,2,3,32,2,3,32,2,3,32,2,4,107
314 DATA 2,4,74,2,3,32,2,3,32,2,3,32,2,3,32,2,3,32
315 DATA 2,4,229,1,3,32,4,3,232,4,3,232,4,3,232,2,3,32
316 DATA 2,3,32,1,4,229,2,4,101,2,4,116,2,4,114,2,4,32

317 DATA 2,4,32,1,4,122,2,4,115,2,4,100,2,4,102,2,4,32

318 DATA 2,3,32,4,1,229,4,1,92,4,1,229,4,1,92,2,4,32
319 DATA 2,4,32,2,4,104,2,4,108,2,4,103,1,4,120,2,4,32

320 DATA 2,4,32,2,4,112,2,4,105,2,4,111,1,4,92,2,3,32

321 DATA 2,3,32,4,3,232,4,3,232,4,3,232,1,3,32,2,4,92
322 DATA 2,3,32,2,3,32,2,3,32,2,3,32,2,3,32,2,4,106
323 DATA 2,3,81,2,3,32,2,3,32,2,3,32,2,3,32,2,2,32
324 DATA 2,3,227,1,3,32,4,3,212,3,1,230,4,3,213,2,3,32

325 DATA 2,3,32,1,3,99,2,4,101,2,4,116,2,4,114,2,4 32

326 DATA 2,4,32,1,4,122,2,4,115,2,3,100,2,4,102,2,4,32

327 DATA 2,4,32,3,1,227,3,1,227,3,1,227,3,1,227,2,4,32

328 DATA 2,4,32,2,4,104,2,3,108,2,4,103,1,4,120,2,4,32
329 DATA 2,4,32,2,4,112,2,4,105,2,4,108,1,3,118,2,3,32

330 DATA 2,3,32,4,3,215,3,1,230,4,3,214,1,3,32,2,3,227

331 DATA 2,3,32,2,3,32,2,3,32,2,3,32,2,3,32,2,3,113

332 DATA 2,3,25,2,3,32,2,3,32,2,3,32,2,3,32,2,3,32
333 DATA 2,3,227,1,3,32,1,3,121,1,3,121,1 3,121,2,3,32

334 DATA 2,3,32,1,3,227,2,4,101,2,4,116,2,4,114,2,4,32

335 DATA 2,4,32,1,4,122,2,4,115,2,4,98,2,4,102,2,4,32

336 DATA 2,4,32,3,1 227,3,1,227,3,1,227,3,1,227,2,4,32

337 DATA 2,4,32,2,4,104,2,4,110,2,4,103,1,4,120,2,4,32
338 DATA 2,4,32,2,4,112,2,4,105,2,4,111,1,3,227,2,3,32

339 DATA 2,3,32,1,3,117,1,3,117,1,3,117,1,3,32,2,2,227

340 DATA 2,3,32,2,3,32,2,3,32,2,3,32,2,3,32,2,3,107
341 DATA 2,3,74,2,3,32,2,3,32,2,3,32 2,3,32,2,3,32
342 DATA 2 3,227,1,3,32,4 1,232,4,1 232,4,1,232,2,3,32
343 DATA 2,3,32,1,3,227,2,4,101,2,4,116,2,4,114,2,4,32
344 DATA 2,4,32,1,4,122,2,4,115,2,4,100,2,4,102,2,4,32

345 DATA 2,3,32,3 1,227,3,1,227,3,1,227,3,1,227,2,4,32

346 DATA 2,4,32,2,4,104,2,4,108,2,4,103,1,4,120,2,4,32
347 DATA 2,4,32,2,4,112,2,4,105,2,4,111,1,3,227,2,3,32
348 DATA 2,3,32,4,1,232,4,1,232,4,1,232,1,3,32,2,3,227

349 DATA 2,2,32,2,3,32,2,3,32,2,2,32,2,3,32,2,3,106
350 RESTORE 357
351 FOR X=1 TO 11
352 READ S
353 SOUND 1,S,35,10,1,1
354 SOUND 2,S*2,? 34,6,?,1
355 SOUND 4,S/2 34,2,?,1
356 NEXT X
357 DATA 638,568,506,478,638,?,478 506,478 426 568
358 RETURN
359 FOR N=1 TO ?
360 SOUND 2,1000,5,7
361 SOUND 2 1012,5,7
362 NEXT N
363 RETURN
364 CALL &0
```

Eureka!

HERE'S WHAT YOU'VE SAID...

Dear Sir,

Wimborne,
Dorset. BH22 0EY

I must congratulate you on a marvellous game, we purchased Eureka direct from you way back in October, & the whole family have had many amusing hours playing it. Eureka is tremendous value for money, considering there are 5 games included in the price. We have purchased other games recently of round about the £10 mark which we have considered to be daylight robbery! & the interest value has lasted about 1 hour!

So congratulations again, keep up the good work!

Yours faithfully,

J Smart (Mrs)

HERE'S WHAT IT IS...

The storylines travel through five time zones of our history – Prehistoric, Roman Empire, Medieval Britain, Colditz and the Caribbean, where you come face to face with the evil Hugo Von Berg. He is holding us all to ransom and demands to be made Emperor of the World, otherwise he will destroy it. A secret telephone number direct to the British Prime Minister has been specially installed for you to ring when you have worked out the code which will save us all. You must find this code and decipher the telephone number.

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We wish you all the best of luck in your search and to help you on your way, will send you a FREE Guide to Adventure Games (no clues to the £25,000 though!) if you send in a stamp plus your name and address to us.

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We are always actively seeking programs for publication – either for Open Forum, the machine pages or Star Game. When sending in a program for consideration, a clear program listing should be sent, together with, wherever possible, a saved copy on cassette. Documentation – usually not more than 1000 words – should start with a general description of the program, what it does, and then some detail of how the program itself is constructed. We pay very competitive rates, according to the length and nature of the program and the quality of the accompanying documentation.

Windmill

on Enterprise

Having seen a couple of programs demonstrating the graphic capabilities of the Amstrad, I decided to see what could be achieved on the Enterprise 64.

The following program, *Windmill*, draws a circular pattern, similar to the effects obtained with old Spirograph sets, using turtle graphics. It then uses the very powerful *Set Palette* command to cycle through the colours. Different values for the *Right* command will give interesting effects, although the initial plot and angle values may need changing. Hidden construction of the pattern could be achieved by adding the following:– 105 *Set Palette 0,0,0,0*

This simply sets all the *Inks* to black. The rest of the program then cycles through the colours, revealing the pattern.

```
 90 PROGRAM "windmill"
100 GRAPHICS
110 OPTION ANGLE DEGREES
120 PLOT 580,620
130 PLOT ANGLE 90
140 FOR F=0 TO 40
150    FOR I=1 TO 3
160       SET INK I
170       PLOT RIGHT 157;FORWARD 600
180    NEXT
190 NEXT
200 DO
210    SET PALETTE BLACK,BLUE,RED,GREEN
220    SET PALETTE BLACK,RED,GREEN,BLUE
230    SET PALETTE BLACK,GREEN,BLUE,RED
240 LOOP
```

Windmill
by Dave Race

The Music Box



Making music

To start with, it's back to D Tatam's letter, some of whose points I covered last week. Regular readers will recall that the micro concerned in this letter was the Amstrad. (Irregular readers should hang their heads in shame.)

Now, I must confess to a degree of ignorance about the Amstrad, although I have been seeing it around more in recent weeks. One plea I have is for all you musical Amstrad owners to write in with tips, complaints, advice, requirements or whatever. The one point left over from the Tatam letter after last week, I can deal with, however.

As a matter of fact, this is a topic I've dealt with before – but it's worth repeating, all the same. The question is how to interface a trumpet, which has already been played through a Vox Octavoice, with the Amstrad.

I know nothing about the Vox, but assume it produces analogue output – Tatam indicates that it is some form of octave divider, producing trumpet and tuba sounds from the trumpet input. Interfacing requires a digital signal and musical devices which are not specifically digital (which is to say, all of them apart from the newer synths and drum machines) must be converted into digital signal sources.

In general, this is done by use of an analogue-to-digital converter, which is an electronic device which converts voltage levels into numbers and is thus able to sample a musical waveform. An acoustic instrument must, of course, first be played through a mike or pick-up and some form of electronic amplification circuit. One should be able to feed the output of a device like the Vox direct into an ADC.

Given the rapid conversion speeds necessary and the amount of memory required to store the results of enough samples to be useful, the technique is best used with a digital sound sampler (DSS) which digitises a single musical sound and uses the data as a sort of template from which to produce a variety of synthesised sounds similar in quality.

As far as I know, there are no DSS systems for the Amstrad – so that could be a project for a musical Amstrad owner with a soldering iron. We have dealt with DSS systems for the Spectrum, Apple and Commodore machines in previous articles – which brings me neatly to a news item.

Ricoll Electronics have recently announced a musical keyboard interface allowing you to play sampled sounds using any standard 1 volt per octave synth keyboard. The DSS itself costs £177.75 and the keyboard interface will set you back another £41.95. Further information may be obtained from Ricoll at 48 Southport Road, Ormskirk, Lancashire L39 1QR (tel. 0695 79100).

Finally, back to the Amstrad and good news for Amstrad owners in search of music. Kuma Software have just announced a package called *Music Composer* for the Amstrad which promises to fill some of the gap in CPC 464 software. It provides all the basic compositional facilities and sells for £9.95. Further information from Kuma at 12 Horseshoe Park, Pangbourne, Reading RG8 7JW (tel. 07357 4335) and a review from me as soon as I've tried it.

Gary Herman







Open Forum

Graphics

on Research 380Z

This program was first designed to just act as a demonstration for the graphics capabilities of the 380Z Microcomputer, but then after watching some of the children at my school trying to program some animation into the machine, I realised that this program would be the perfect tutor for how to use the machine's sophisticated *Display* function. This as it stands is a feature which is on most home micros, but cannot be accessed very simply. The advantages of the Research machines is that you can save a series of images into an area of memory ready to be displayed in rapid succession.

After running the program, a rotating cube appears – to move on the to the rest of the program, press *Ctrl Z*, although you may have to press it several times to produce the result!

```
10 A$="RESOLUTION":B$="CHARSIZE":C$="STPLOT"
20 ON BREAK GOTO 320
30 PUT 12:A=0:B=1:C=0:D=3:E=1
40 CALL"RESOLUTION",1,1
50 FOR J=0 TO 1
60 FOR K=0 TO 3
70 CALL"UPDATE",J,K
80 CALL"OFFSET",30,30
90 READ X,Y
100 CALL"PLOT",X,Y,1
110 READ X,Y
120 IF Y=0 THEN 150
130 CALL"LINE",X,Y
140 GOTO 110
150 NEXT K,J
160 FOR I=1 TO 20
170 FOR J=A TO B STEP E
180 FOR K=C TO D STEP E
190 CALL"DISPLAY",J,K
200 G$=GET$(5):IF G$<>"" THEN 220
210 NEXT K,J,I
220 F=A:G=C:A=B:B=F:C=D:D=G:E=E*-1:GOTO 160
```

Book Ends

Book *ZX Spectrum Whizz Kid* **Price** £5.95 **Micro** Spectrum **Supplier** Longman Group Limited Longman House Burnt Mill Harlow Essex CM20 2JE

Do you want to be a *ZX Spectrum Whizz Kid?* If so you'll need a very unusual Spectrum so you can "press either the Commodore or Shift key to get some of the symbols" or "press the space bar to keep playing" (should that be *Spectrum + Whizz Kid?*)

These aren't crucial errors but they're indicative of a sloppiness that shouldn't rear its head in a book meant for young beginners. Nor should variable "a$" in a listing become "A$" in the notes.

There are numerous large cartoons but I'm not convinced that these compensate for the brevity and possible lack of clarity of the comments.

In a highly competitive area of computer publishing this is unlikely to provide any "kid" with enough 'whizz' to make it worth buying. **John Minson**

Book *The Writer and the Word Processor* **Price** £2.95 **Micro** Any **Supplier** Coronet Books, Mill Rd, Dunton Green, Sevenoaks Kent TW13 2YE

This book is rather a cosy chat between would be novelists, with a nod at journalists.

It's not a bad read, although there is nothing here that couldn't be picked up from a dozen other publications – for example, no really helpful low-down on those printer codes. The information given would help no-one in deciding which system to use, or how to go about choosing one for ease-of-use. Instead, the book is a comfort to those writers who, being completely computer-naive, may be hesitating about taking the plunge into word-processing.

There are unfortunately a few instances of that elitist computer snob-erese that says you have to spend a few hundred pounds before anything "serious" can be done with the computer – for example, on page 163, we're told, pretty categorically, *'you can't use a domestic TV set as a screen for word processing!'* (author's italics). *Rubbish!* (my italics). Of course you can, although it would certainly be easier on the eyes to use a monitor.

If you're wondering whether to invest in a word processing outfit, read this book, and it may give you an insight into how other authors use their computers – however, if you want to find out how to get your Noity-Toity MkVI to print in italics it would be cheaper and quicker to read the manual supplied.

Tony Bridge

Book *Capital Radio's Book of Computers and Simple Programming* **Price** £3.95 **Micro** Any **Supplier** Interface Publications Ltd 9/11 Kensington High Street, London W8 5NP

Those who live around London and listen to Capital's *XYZ On Air* will know the voice of Kelly Temple. Now his grin positively beams out from page six of this beginner's programming guide.

In addition to the introduction to Basic his book contains scanty reviews of several micros and, an idiosyncratic glossary of computer terms.

On the whole the book is not actually bad, apart from its unhelpful treatment of computer mathematics – but why anybody should buy a general tutorial when so many good ones dedicated to specific micros are available escapes me. **John Minson**

Open Forum

continued from Page 47

```
230 REM********************************
240 DATA 40,60,60,110,110,110,110,40,60,60,0,0
250 DATA 105,57,56,61,56,109,105,111,105,57,114,60,114,102,105,111,0,0
260 DATA 96,58,52,63,52,107,96,112,96,58,117,67,117,103,96,112,0,0
270 DATA 92,57,58,64,58,106,92,113,92,57,119,66,119,104,92,113,0,0
280 DATA 85,57,49,65,49,105,85,113,85,57,120,65,120,105,85,113,0,0
290 DATA 78,57,50,66,50,104,78,113,78,57,119,64,119,106,78,113,0,0
300 DATA 71,58,52,67,52,103,71,112,71,58,117,63,117,102,71,112,0,0
310 DATA 66,59,56,68,56,102,66,111,66,59,115,61,115,109,66,111,0,0
320 PUT12
330 A=1
340 GRAPH 1
350 CALL"RESOLUTION",0,2
360 X=0:X1=300:Y=96:Y1=84
370 CALL"PLOT",X,90,A
380 CALL"LINE",150,Y1,A:CALL"LINE",X1,90,A
390 CALL"LINE",150,Y,A:CALL"LINE",X,90,A
400 X=X+10:X1=X1-10
410 Y=Y-A:Y1=Y1+6
420 IF Y>=0THEN 370
430 FOR E=1 TO 195
440 CALL"COLOUR",A,E:NEXT E
450 CALL"CLEAR"
460 PUT12
470 REM********************************
480 INPUT"CENTRE X,Y";HS,VS
490 INPUT"RADII A,B (MAKE EQUAL FOR REGULAR SHAPE)";A,B
500 INPUT"NUMBER OF SIDES (120 FOR CIRCLE)";N
510 INPUT"CONE GENERATION (Y/N)";IC$:IFIC$="N" THEN 540
520 INPUT"POINT OF CONE X,Y";PX,PY
530 PUT 12
540 ANGLE=2*3.142/N
550 C=COS (ANGLE):S=SIN(ANGLE)
560 XA=1:YA=1
570 FORI=1TON+1
580 X=XA*C-YA*S
590 Y=XA*S+YA*C
600 XA=X:YA=Y
610 IF I>1 THEN P$="LINE" ELSE P$="PLOT"
620 CALL P$,A*XA+HS,B*YA+VS,3
630 IF IC$="N" THEN 650
640 CALL"LINE",PX,PY,3: CALL"PLOT",A*XA+HS,B*YA+VS,16
650 NEXT I
660 G$=GET$(500)
670 ON BREAK GOTO 1980
680 PUT 12:CALL"RESOLUTION",0,0
690 FOR A=1 TO 390 STEP 5
700 CALL"PLOT",132,A,3
710 CALL"LINE",0,0
720 CALL"PLOT",132,A,3
730 CALL"LINE",300,0
740 NEXT A
750 CALL"RESOLUTION",0,0:PUT 12
760 FOR A=1 TO 290 STEP 5
770 CALL"PLOT",100,A,3
780 CALL"LINE",0,0
790 CALL"PLOT",100,A
800 CALL"LINE",0,300
810 CALL"PLOT",150,A
820 CALL"LINE",300,0
830 NEXT A
840 CALL"RESOLUTION",0,0:PUT 12
850 FOR A=1 TO 400 STEP 5
860 CALL"PLOT",90+90*SIN(A/180*3.141597),90+90*COS(A/180*3.141597),3
870 CALL"LINE",A,A,3
880 NEXT A
890 GRAPH1
900 GOSUB 1550:PUT 12
910 FOR A=1 TO 191 STEP 5
920 CALL"PLOT",30+(SIN(A)*2)*3.14,A
930 CALL"LINE",191,0,3
940 CALL"PLOT",A,30+(SIN(A)*2)*3.14
950 CALL"LINE",191,191
960 CALL"PLOT",30+(SIN(A)*2)*3.14,A
970 CALL"LINE",A,191
980 NEXT A
990 PUT 21:A$=GET$(1):CALL"RESOLUTION",0,9:PUT (12)
1000 FOR I=1 TO 3
1010 FOR Y=1 TO 191
1020 CALL"LINE",X,Y,I
1030 CALL"PLOT",191,INT(RND(1)*191)+I
1040 NEXT Y,I
1050 GOSUB 1550
1060 REM********************************
1070 GRAPH 1 : GRAPH 0
1080 CALL"RESOLUTION",1,4
1090 Y=90
1100 FOR I=0 TO 15
1110 CALL"PLOT",0,Y,0
1120 CALL"LINE",150,Y,I
1130 Y=Y-4
1140 NEXT I
1150 X1=0 : Y1=0 : X2=0 : Y2=16
1160 FOR C=0 TO 15
1170 CALL"FILL",X1,Y1,X2,Y2,C
1180 X1=X1+10 : X2=X2+10
1190 NEXT C
1200 GOSUB 1550
1210 FOR A=1 TO 100 STEP 2
1220 FOR B=1 TO 100
1230 CALL"LINE",A,B,A
1240 CALL"LINE",B,B,A
1250 CALL"LINE",A,B,A
1260 NEXT B,A
1270 GOSUB 1550
1280 FOR A=1 TO 50
1290 FOR B=1 TO 50
1300 CALL"LINE",A,B,A
1310 CALL"LINE",A,A,B
1320 NEXT B,A
1330 GOSUB 1550
1340 FOR A=1 TO 2
1350 FOR B=1 TO 200
1360 CALL"LINE",A,B,A
1370 CALL"LINE",A,A,B
1380 CALL"LINE",B,B,A
1390 CALL"LINE",B,A,B
1400 NEXT B,A
1410 GOSUB 1550
1420 LET A=1
1430 FOR B=191 TO 0 STEP-1
1440 CALL"LINE",A,B,A
1450 CALL"LINE",B,A,B
1460 CALL"LINE",A,A,A
1470 CALL"LINE",B,B,B
1480 CALL"LINE",Y,X,X
1490 FOR X=0 TO 10
1500 FOR Y=1 TO 46
1510 CALL"LINE",X,Y,X
1520 CALL"LINE",X,Y,X
1530 NEXT Y,X
1540 GOTO 1570
1550 CALL"CLEAR"
1560 RETURN
1570 CALL"CLEAR"
```

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Avalon tips

I'm very pleased to be able to print the first Amstrad 464 *Pokes* this week and my thanks go out to T A Shah of Blackburn for a very enjoyable letter, and for his sterling work in working them out As 'T' says, "I would like all Amstrad owners to appreciate my efforts – it was very difficult without a disassembler " Well I'm sure that they do and without further ado here are the listings. They should be typed in before running the programs and will automatically skip the Basic loaders

Electro Freddy– 10 *Memory* 10000 / 20 *Load* "A1" / 30 *Load* "A2" / 40 *Load* "A3" / 50 *Load* "A4" / 60 *Load* "A5" / 70 *Poke* 39356,255 / 80 *Call* 39323 (NB 255 is the number of lives)

Punchy– 10 *Memory* &1FFF / 20 *Load* "Code" / 30 *Poke* &20A9, 255 / 40 *Call* &2000

Roland On The Ropes:– 10 *Memory* 4800 / 20 *Load* "Roland D" / 30 *Load* "Roland C" 35 *Ink* 0,1 *ink* 1, 24 *ink* 2, 20 *ink* 3,6 / 40 *Poke* 25804 0 *Poke* - 25582,0 / 50 *Call* 41100 (N B The minus poke numbers are correct!)

Hunchback 10 *Border* 0 *ink* 0,0 *ink* 1,18 *ink* 2,5 *ink* 3,25 / 20 *ent* 1, 100, 2,2 / 30 *ent* 2,90,-8,2 / 40 anv 12, 10, -2, 10 / 50 *pen* 2 / 60 *Memory* &3BFF / 70 *Load* "HUN 3", &4C00 / 80 *Poke* &61F8, 1 / 90 *Poke* &61F9, 1 / 100 *Poke*&61F8 + 18, 1 / 110 *Poke* &61F8 + 19,1 / 120 *Poke* &61F8 + 26, 1 / 130 *Poke*&61F8 + 27, 1 / 140 *Poke* 20782,0 / 150 *Call* &5431 (NB Most of these pokes are necessary to initialise the game colours, sound, etc)

The letter then goes on to say that since buying his 464 his old Spectrum has seemed so weedy that be can't bear to touch it again, despite the difficulty of getting software for the Amstrad This is doubtless aggravated by the fact that "out of 400 Spectrum games I've ever had, the only ones that have been worth the money are *Halls of the Things* by Design Design, *Manic Miner* by Software Projects, *Lords of Midnight* by Hewson Consultants, *Jet Pac* and *Knight Lore* by Ultimate *Valhalla* and *Hobbit* were £30 down the drain"

Of all the games listed above 'T' has finished them all without cheating and says that the most enjoyable was *Avalon* Here are his tips on how to finish so stop reading now if you don t want to know

"I finished the game in three days of it being delivered – the main tips are 1) Make a map! 2) Find the 'wriggly' sword 3) Find the wraithbane spell 4) Find the amulet 5) Find the sword Caliburn 6) Find the cup of Power Make the servant carry the wriggly sword and go over the goblins with it to kill them. To kill wraiths activate the wraithbane and move into them. The amulet reflects the fireballs of the Lord of Chaos To destroy the Lord put the sword Caliburn over the cube with faces on

"Although skulls and skeletons in the foreground cannot be examined you will find some in the background which contain keys if you pass your servant over them If you hold the cheese over the mousehole, if you have found these, you will catch a mouse and this can be used to gnaw the rope that ties a key to a wall

"To get to the Lord of Chaos you will find 5 or 6 stones with images on them Dump these on the flashing 'wheel' on the floor and a door will appear which takes you to the bottom level The stones are hidden in pools, trapdoors or have something guarding them

"To get the Caliburn and the cup of Power you need the 'find' spell The cup is in the chamber next to the find spell and the sword is in the scorpion's room which is near to the image of a lady's face in the wall (kill the scorpion with the sword) Both items are invisible but activate the spell and run the 'eye' over the back walls "

Thanks very much for the tips and please write again Can anyone help 'T' to find the seven odd wizards that are supposed to be in Avalon.

Someone who seems to have found them is Robert Muir of St John's Wood London Robert's letter arrived in the same postbag as the one above, so I really can't say who was first to finish

Whilst on the subject of epic 'firsts' how about this letter from Michael Green of Enfield who finished *Gift from the Gods* on Dec 29th to receive the final message 'Hail Orestes! King of Mycenae!' For those still struggling here are a few tips from Michael "Most of the shapes are illusions To kill a monster keep scything at it until it is stunned – a buzzer than sounds (sounds like *The Price is Right* to me) You can then stab at the stationary creature and it will disappear " More excitement next week

Tony Kendle

Games Wizard Competition

Play the games,send in your high scores on the form and you could become The Games Wizard

	Commodore	BBC	Spectrum	Amstrad
Game 1	Suicide Express	Elite	Technician Ted	Sorcery
Game 2	Beach Head	Jet Pac	3D Star Strike	Splat!
Game 3	Shoot the Rapids	Chuckie Egg	Cyclone	Manic Miner

Game Wizard Entry Form

Micro . .

Game 1 score

Game 2 score

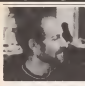
Game 3 score

Name

Address

Your signature

Witness s signature



Help, please!

Down straight away to the Help this week, well, almost away! First of all, I want to pass on some very sad news – Popular's sister magazine, *MicroAdventurer* is no more. The software market is rather depressed at the moment (though not depressing, I think), and circulation, while growing rapidly, was not growing rapidly enough to keep the old wolf from the door. I shall miss the magazine a great deal, and I would like to think that some of you out there will miss it too. I very much enjoyed being a small part of it, and also enjoyed the rapport we had with many of the readers.

Alison Martyn wrote many months ago about *Colossal Adventure*, from Level 9. It's been a long time, Alison, and I suppose you have sorted this one out by now, but it's an interesting problem, and the one that several other adventurers have written about. To get the platinum Pyramid – When in Y2, say *Plugh*. This will return you to the Building at the start, where you can deposit your treasure. Now, saying *Plugh* again, then *Plover*, will send you to the Plover room, lamp in hand, from where you can travel to the Dark Room and the Elusive Pyramid.

From one superb subterranean adventure to another, the second part of the Zork trilogy. George Lusher wants some guidance ('no obvious answers please, just hints and clues' he says) in getting past the Dragon, and the Lizard Head. Just try attacking the Dragon, George, then lead it to a cold place. As for the Lizard Head Door, you will need a golden gift from a grateful unicorn, and some sweet insects from an evaporated pool.

The dark, dank caves are a favourite setting for adventures, and another, that takes place largely underground, is *Mountains of Ket*, the first part of the Ket Trilogy. The skull is proving a bit of a headache for many people – and so it should, being the last location in what was the run-up to a nice little prize (this has, of course, been claimed now by master adventurer Tom Frost).

Although many adventures put a premium on grabbing and keeping as many treasures as possible, in this instance, the player must have only three: the Skull will then open and the end of the game is nigh. Those items are 8, 36, 25. The hat, incidentally, is to be found miles from the Skull, on a plateau – to reach the mountains, you must ascend from the east end of the caves. And don't forget to take your medicine with you!

To find the Mint Room, go east several times from the Guard – once there 30, 2 and 38, 14 (excruciatingly obvious isn't it?).

David Scott had a tip that will come in handy to those of you trying to get into Part five of *Eureka!* 'All you do,' he says, 'is play the arcade game and then load the adventure. When the program asks you the first question, you must press Caps Shift and Break at the same time. A flag and a message will then appear on screen. If you wait a while, this will soon disappear and you are soon into the adventure!' Thanks, David – now, can someone please tell us all how to escape the dreaded brain-sucking boredom of those arcade games?

But there are some people who, despite all reason, still wade through the wavering blobs to play the adventure – like Justin Travis, who wants to know how to get past the Green Knight in Number Three. He also asks: 'Where do I find Morkin, in *Doomdark's Revenge?*' You could try looking at the top of the map, Justin, in the Icy Wastes. As you'll know, it is not normally possible to cross the Icy Wastes, but Doomdark contains some very handy tunnels.

S F Hollinshead, a name we've seen before in the Corner, has a tip for those Eurekans stuck in the Roman Adventure. 'To find the Swamprose, go 9, 26, 32, 25, 8 from the south gate of Rome.'

I have mentioned *Podzelski* before, but don't actually know who produces it, how much it costs, or what it is all about (one doesn't get much of a clue from the title after all!), but David Thorpe does, and has kindly sent a few hints to help others. 'In order to escape the Wine Cellar, 33, 7, 15, 40, 26, 1, 24. And, when in the Bedroom, don't shut the window, whatever happens. If you get to the Hall, try 37,5, 16, 26! In the Police Cell, don't leave the telephone ringing for too long. Can anyone help me with my problem in this game? How do I stop the deaf man's hearing aid exploding when I give him the battery?' Sounds a load of fun! Write to David at 46 Frimley Road, Camberley, Surrey GU15 3UX.

A name that is never far from Help columns is Scott Adams, and we now come to the first questions I've received about his new Questprobe adventure, *Spiderman*. This is from A Bimpson, from 'The Funny Farm for Frustrated Adventurers in Wigan'! He wants to know how to get past the Fan, and how to defeat the Ring Master. There are two ways of stopping the fan. The slow way is to repeatedly 11, 4, 23, 41, 17. This will eventually slow down and halt the fan, but a quicker way is to 34, 13. When you meet the ringmaster, just close your eyes and he will tell you what to do next! Mr (?) Bimpton sends a couple of clues for other problems in the adventure. To get the Gem from Hydroman, 33, 27 and to find some of the Web Formula, 38, 13, 18, 3, 31.

To round up the Help for this week, I have had a plea from Pete Stone of Palace Software, the distributor of that lovely adventure, *Valkyrie 17* (help coming for this soon!). He has been inundated with phone calls from frustrated adventurers (in Wigan?) – "Please," he cries in a weak voice, "Don't call us, we don't know any answers!" Somebody who does know is Kit Watson, of 35 Ordnance Street, Chatham, Kent ME4 6SJ. If you're in trouble, send him an SAE and he will help you out. A couple of hints I can give now are: To break into the safe, you 35, 16, 10. To put the Security Camera out of action, 22, 6.

1 SMASH 2 WAND 3 J.J.'S 4 WEB 5 ON 6 CAMERA 7 BOTTLE 8 CLOAK 9 SOUTH 10 STETHOSCOPE 11 SHOOT 12 GRILL 13 PICTURE 14 POLO 15 FROM 16 THE 17 IN 18 HAPPY 20 ADVENTURING 21 EVERYBODY 22 SPRAY 23 FLUID 24 DOOR 25 HAT 26 EAST 27 THERMOSTAT 28 TO 29 CHANDELIER 30 WAVE 31 OFFICE 32 SOUTHWEST 33 USE 34 THROW 35 WEED 36 BEARD 37 SWINGING 38 RIP 39 SAY 40 SHELF 41 AT 42 USE

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Adventure .... on (Micro) ....

Problem ....

....

Name ....

Address ....

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This series of articles is designed for novice and experienced Adventurers alike. Each week Tony Bridge will be looking at different Adventures and advising you on some of the problems and pitfalls you can expect to encounter. So if you have an Adventure you want reviewed or if you are stuck in an Adventure you cannot progress any further write to Tony Bridge, Adventure Corner, *Popular Computing Weekly*, 12-13 Little Newport Street, London WC2H 3LD.



Computing in Cobol

Mr Arnold of Birmingham writes.

Q I am considering buying either the Amstrad or BBC micro, although the one I buy must have the *Cobol* language available. Please could you advise me on either of these micros and any other information would also be appreciated.

A *Cobol* on an Amstrad or a BBC is in fact not available unless you spend quite a lot on upgrading to full CP/M and find yourself a copy of a CIS *Cobol* compiler. I presume that you will be using *Cobol* in a course of study that you are about to start, and that therefore your micro must have this feature. I'm afraid that the ones you have indicated do not offer this language at the moment.

Memory mystery

T Nadel of London writes

Q I wonder whether you could help me with a problem that I have with the Spectrum 48K? Whilst all the 16K programs that I have work flawlessly and for hours, the 48K programs such as *Cyrus Is Chess*, *Backgammon* and *Tasword 2* crash within half an hour after starting, and sometimes less than that. The *Backgammon* program for reasons best known to itself only loads when the computer has not been used for some hours, whilst *Tasword* will retain the text on the screen but refuse to comply with any commands.

As I said before, the 16K programs will work continuously for hours on end. I would be grateful for any information that would help me cope with this problem.

A It would appear that you have some serious problems with the Ram chip, in that either data stored in the Ram is being lost or is being corrupted. In either case the cure is simple, your Spectrum will have to be repaired and the relevant failing components replaced. On this page over the last few months I have given the addresses of a number of companies that will carry out repairs of this type quite cheaply. I suggest that you contact one of these firms and discuss your problem with them.

Difficult load

J Westmacott of Worcester, writes

Q I own a Commodore 64 and appear to have a fault on the machine which I cannot detect. I have played many games with no loading problems, except *Valhalla* and *Solo Flight* which only load at about the third attempt. This isn't too bad because they do eventually load. My problem is that I have tried to load 2 separate tapes of *Return to Eden*, the Level 9 adventure and it is just impossible, yet it loads OK on a friend's machine.

As you know I have the Novaload facility. Sometimes the game loads and I get just a blank screen, other times I get a screen full of C's. Please help me as the guarantee runs out soon.

A My only advice, and this also applies to those of you having loading problems on other makes of machine, is to try disconnecting the computer from the TV whilst loading. This may seem a strange piece of advice but it has certainly worked with some programs on both the Spectrum and Spectrum +.

These programs also use fast loaders, so whether this has something to do with the problem, or whether my TV set is producing too much static which is being transmitted down the serial lead I don't know. All I can say is that it really does work.

Fractions in decimal

C Dowell of Brighouse, West Yorkshire, writes:

Q Can you help with the following problem? I want to include a routine to convert fractions to decimals in a program I am writing. The fractions would be entered as either 27/64 (ie, below 1) or as 2 13/32 (ie, between 1 and 9). I had envisaged the latter fractions as being entered as 2.13/32 therefore using the full stop to separate the integer from the fractional part. Can you please help with the conversion?

A The following routine will carry out fractions to decimal conversion ... but beware it does not include much in the way of error checking!

```
10 INPUT a$ 20 FOR i = 1 TO
LEN a$ : IF a$(i TO i) = "."
THEN LET k = i-1 : LET i =
LEN a$ 30 NEXT i 40 LET b$ =
a$(1 TO k) 50 LET a$ =
a$(k+2 TO) 70 FOR i = 1 TO
LEN a$ 80 IF a$(i TO i) = "/"
THEN LET k = i-1 : LET i =
LEN a$ 90 NEXT i 100 LET c$
= a$(1 TO k) 110 LET d$ =
a$(k+2 TO) 120 IF b$ = ""
THEN LET b$ + "O" 130 IF c$
= "" OR d$ = "" THEN GOTO
10 140 LET a =((VAL b$ ) *
(VAL d$)) + ((VAL c$) / (VAL
d$)) 150 PRINT a
```

Shopping list

L Findlay of Scotland writes:

Q I am 14 and have had a 48K Spectrum since last Christmas. I have now come into some money, and naturally want to spend it. So please could you tell me the following.

1) How cheaply could I get a Sord M5 and is it worth buying?

2) What modems come into the under £100 price range and are worth buying (for the Spectrum)?

3) What, in your opinion is the best game, *Underworlde* or *Knightlore*?

4) Which is the best speech synthesiser?

A A second hand M5 can be picked up quite cheaply, as you will no doubt have noticed from reading the classifieds section of *PCW*! As to whether it is worth buying it depends what you want to use it for. Personally, I would think that the lack of software makes it a fairly unattractive machine in today's market.

Your question on modems is almost as hard to answer as your first question. There are a number of modems in your price range (Maplin's own, or the Micro Myte to name but two), but whether they are worth buying depends on what you wish to communicate with.

On to question three ... I would choose *Knightlore*. (Sorry, no explanations, I have no intention of starting any arguments)

The best speech synthesiser, eh? ... The Currah is as good as any.

Many thanks

P Robinson of Dane Road, Bedfordshire writes

Q In respect to your answer to Craig Lambie in the November 8th issue. There is a chess program for the unexpanded Vic in *Innovation Computing* by Clifford Ramsman.

A I have also received a letter from Mr R Wallbank who has kindly offered Craig an unwanted copy of *Sargon 2* cartridge. Mr Wallbank's address is 'Nurses Home' Heath Charnock Hospital, Chorley, Lancashire PR6 9EH'.

Is there anything about your computer you don't understand, and which everyone else seems to take for granted? Whatever your problem *Peek* it to Phil Rogers and every week he will *Poke* back as many answers as he can. The address is *Peek & Poke, PCW*, 12-13 Little Newport Street, London WC2R 3LD

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ADVENTURE HELPLINE

Message from Andromeda on CPC 464. I can't get past the panel in the mirrored room at the beginning of the adventure Stephen Hall 10 Closefield Grove Whitley Bay Tyne and Wear NE26 8ST

Kentilla on Spectrum How do you use the furnace and open the chest in the bedroom? Robert Wardle 30 Tennyson Drive Tollcross Glasgow

Forest at Worlds End on CPC 464. How do I get out the witch's hobel without being killed by the magic powder and witch? Jamie Gardiner, 5 Queensdown Avenue Rainham Kent. 0634 397834

Message from Andromeda on CPC 464 What do I do in the blue and mirrored rooms? Terry Harrington 19 Chinchilla Rd Southchurch Southend on Sea Essex.

Castle of Terror on C64. How do you light the glass lantern? I have the flint and bone Gordon Wade 31 Lustee Rise, Catterick Garrison, North Yorks DL9 4DN

The Hobbit on Spectrum I can't get past the trolls O S Andersen April Cottage Chalford Lane Pembury Tunbridge Wells Kent

The Hobbit on Spectrum. I'm stuck in the goblin's dungeon and I can't get past the eyes in the forest. Dawn Larman 29 Bailey Cres. Congleton, Cheshire 0260 275139

Message from Andromeda on CPC 464 How can I get past the panel with the square plate in the mirror room? What do I do at the pedestal? Robert Stanley 15 Harradon Rd, Walton, Liverpool L9 0HE

Message from Andromeda on CPC 464. What can I do with the pedestal, with the disk or with the panel with the plate to get past this stage? Nicholas O'Loghlen 8 Sarn Hill Stanley Co Durham DH9 8AN

Empire of the Overmind on Atari. How do I get the sword from the dwarf? H. T. Walker 7 Burnet Avenue, Burpham, Guildford Surrey

The Hobbit on Spectrum. Any answers to Gollum's riddles? Any use for the golden key? John Anderson, 28 Gilfillan Rd Dunfermline Fife Scotland.

Fantastic Diamond on CPC 464 How do you get past the river and open the manhole? Andrew Lane 2 Philip Drive Flackwell Heath, Bucks HP10 9JD

Twin Kingdom Valley on Commodore 64 Where do I find the lost desert kings treasure chest and how do I get the masters key without being killed by the dragon? Vincent Ruis 42 Rambamesss Street 2033 Gra Haarlem Holland.

COMPUTER SWAP

COMPUTER SWAP

Computer Swap entries are limited to 30 words Either fill in the accompanying form and send to Computer Swap *Popular Computing Weekly* 12 13 Little Newport Street, London WC2H 7PP or telephone 01-437 4343

All software offered through computer swap must be in original condition and for private sale only

It cannot be swapped
Warning: It is illegal to advertise pirated software

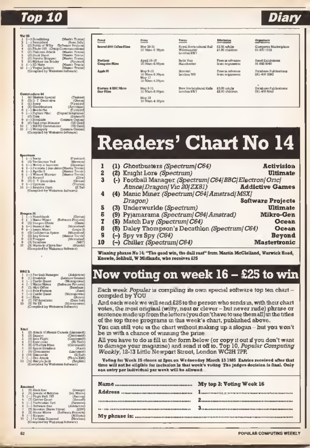
Please write your copy in capital letters on the lines below

Name ...

Address ...

...

Telephone ...



Top 10

Vic 20

1	(—)	Doodlebug	(Master Tronic)
2	(—)	Bewitched	(Sean Jolly)
3	(5)	Perils of Willy	(Software Projects)
4	(9)	Flight 015	(Craig Communications)
5	(7)	Phantom Attack	(Master Tronic)
6	(8)	Duck Shoot	(Master Tronic)
7	(2)	Psycho Shopper	(Master Tronic)
8	(6)	Mickey the Bricky	(Firebird)
9	(—)	3D Maze	(Master Tronic)
10	(—)	Vegas Jackpot	(Master Tronic)

(Compiled by Websters Software)

Commodore 64

1	(4)	Shoot em Special	(Taskset)
2	(5)	D T Decathlon	(Ocean)
3	(1)	Booty	(Firebird)
4	(2)	Ghostbusters	(Activision)
5	(—)	Headache	(Firebird)
6	(—)	Fighter Pilot	(Digital Integration)
7	(9)	Trek	(Sinteceft)
8	(—)	Scrabble	(Leisure Genius)
9	(6)	Raid over Moscow	(US Gold)
10	( )	NATO Commander	(US Gold)
10	(—)	Monopoly	(Leisure Genius)

(Compiled by Websters Software)

Spectrum

1	(—)	Booty	(Firebird)
2	(4)	Technician Ted	(Hewson)
3	(—)	Monty is Innocent	(Gremlin)
4	(—)	Formula 1 Simulator	(Master Tronic)
5	(—)	Apollo 8	(Master Tronic)
6	(—)	Wizard Warrior	(Master Tronic)
7	(3)	Airwolf	(Elite)
8	(9)	D T Decathlon	(Ocean)
9	(—)	Cyclone	(Vortex)
10	(—)	Boulder Dash	(K Tel)

(Compiled by Websters Software)

Dragon 32

1	(—)	Pinchback	(Ocean)
2	( )	Manic Miner	(Software Projects)
3	(1)	Dragon Chess	(Oasis)
4	(—)	Bananrd Bar	(Microdeal)
5	(—)	Learn Music	(Logic 3)
6	(8)	Cuthbert in Space	(Microdeal)
7	(3)	Bug Driver	(Master Tronic)
8	(3)	Frogger	(Microdeal)
9	(9)	Database	(MST)
10	(3)	Mystery of Java Star	(Shards)

(Compiled by Websters Software)

BBC B

1	(—)	Football Manager	(Addictive)
2	(1)	Scrabble	(Leisure Genius)
3	(—)	Castle Quest	(Micropower)
4	(—)	Manic Miner	(Software Projects)
5	(3)	Mini Office	(Database)
6	(—)	Pole Position	(Atari)
7	(—)	Castle Quest	(Micropower)
8	(—)	Elite	(Acorn)
9	(7)	747 Simulator	(Data Soft)
10	(8)	Mr EE	(Micropower)

(Compiled by Websters Software)

Atari

1	(8)	Attack of Mutant Camels	(Llamasoft)
2	(3)	Zaxxon	(Centresoft)
3	(4)	Solo Flight	(Centresoft)
4	(1)	Encounter	(Hi Tech)
5	(6)	O'Reillys Mine	(Centresoft)
6	(6)	Space Invaders	(Atari)
7	(3)	Gridrunner	(Llamasoft)
8	(10)	Diamonds	(E/Soft)
9	(—)	Ore Attack	(Thorn EMI)
10	(10)	Steeple Jack	(English)

(Compiled by Websters Software)

Amstrad

1	(3)	Dark Star	(Design)
2	(6)	Jewels of Babylon	(Int. Micro)
3	(—)	Flight Path 737	(Anirog)
4	(7)	Centre Court	(Amsoft)
5	(—)	Technician Ted	(Hewson)
6	(—)	Software Star	(Addictive)
7	(3)	Snooker (Steve Davis)	(CDS)
8	(3)	Manic Miner	(Software Projects)
9	(—)	Bagger	(Alligata)
10	(—)	Fantasia Diamond	(Hewson)

(Compiled by Websters Software)

Diary

Event	Dates	Venue	Admission	Organisers
Second 8000 Office Show	Mar 30-31 10 30am-6 00pm	Royal Horticultural Hall Westminster London SW1	£2.50 adults £1.50 children	Computer Marketplace 01-930 1612
Northern Computer Show	April 16-18 10.00am-6.00pm	Belle Vue Manchester	Free in advance from organisers	Reed Exhibitions 01 643 8040
Apple 85	May 9-11 10 00am-6.00pm May 12 10 00am-4.00pm	Novotel London W6	Free in advance from organisers	Database Publications 061-456 8383
Electron & BBC Micro User Show	May 9-11 10 00am-6.00pm May 12 10 00am-4 00pm	New Horticultural Halls London SW1	£3.00 adults £2.00 children	Database Publications 061-456 8383

Readers' Chart No 14

1	(1)	Ghostbusters *(Spectrum/C64)*	**Activision**
2	(2)	Knight Lore *(Spectrum)*	**Ultimate**
3	(-)	Football Manager *(Spectrum/C64/BBC/Electron/Oric/Atmos/Dragon/Vic 20/ZX81)*	**Addictive Games**
4	(4)	Manic Miner *(Spectrum/C64/Amstrad/MSX/Dragon)*	**Software Projects**
5	(3)	Underwurlde *(Spectrum)*	**Ultimate**
6	(9)	Pyjamarama *(Spectrum/C64/Amstrad)*	**Mikro-Gen**
7	(5)	Match Day *(Spectrum/C64)*	**Ocean**
8	(8)	Daley Thompson's Decathlon *(Spectrum/C64)*	**Ocean**
9	(-)	Spy vs Spy *(C64)*	**Beyond**
10	(-)	Chiller *(Spectrum/C64)*	**Mastertronic**

Winning phrase No 14: "The good win, the dull rust" from Martin McClelland, Warwick Road, Knowle, Solihull, W Midlands, who receives £25

Now voting on week 16 – £25 to win

Each week *Popular* is compiling its own special software top ten chart – compiled by YOU

And each week we will send £25 to the person who sends in, with their chart votes, the most original (witty, neat or clever – but never rude) phrase or sentence made up from the letters (you don't have to use them all) in the titles of the top three programs in this week's chart, published above.

You can still vote in the chart without making up a slogan – but you won't be in with a chance of winning the prize

All you have to do is fill in the form below (or copy it out if you don't want to damage your magazine) and send it off to. Top 10, *Popular Computing Weekly*, 12-13 Little Newport Street, London WC2H 7PP.

Voting for Week 15 closes at 2pm on Wednesday March 13 1985 Entries received after that time will not be eligible for inclusion in that week's voting The judges decision is final. Only one entry per individual per week will be allowed

Name .... **My top 3: Voting Week 16**

Address .... 1. ....

.... 2. ....

.... 3. ....

My phrase is: ....

New Releases

SO RIGHT

Given the difference in power, though not, any more, in price, between the Plus 4 and the C16 it's rather unfortunate, from a Plus 4 owner's point of view, that what programs there are tend to be packaged together as C16/Plus4 titles. This means, quite simply, that half the power of the latter machine is completely redundant

Jack Attack is a conversion of a Vic(!) title that did well in America and it comes on cartridge for the two machines from Commodore themselves. Graphically, it doesn't look anything like the current level of 64 offerings – much closer to the Vic, methinks.

The game is one of those rarities where something about the basic idea is so right that other factors like simple graphics can be ignored. The idea here is that you stomp on or crush balloons. The balloons bounce about the screen in the way you'd expect balloons to behave

You are a spacehopper-like animal, jump on top of the balloons to burst them – don't let them land on you. The other element to the game is a series of blocks, differently distributed on each of the levels, which may be used to trap and crush balloons – get all the balloons on each screen and you go on to the next one. However it sounds, it is, in fact very addictive. I'd like to be nice about a program for the new machines, but there's one major problem apart from the technical dullness: it costs £14.95!

Program *Jack Attack*
Price *£14.95*
Micro *Commodore 64*
Supplier *Commodore*
1 Hunters Road
Weldon North
Industrial Estate
Weldon
Corby
NN17 1QX

VOLCANIC

Nemesis, whose Arnold Blackwood adventures have acquired something of a cult following, have launched another adventure in the series titled *Angelique*. It offers the near unique opportunity to play an adventure from the perspective of gasp, more outlandish than trolls and elves – a woman

As Angelique, your task is to survive trials and tribulations and meet up with Arnold with whom you have, well something or other anyway. The authors claim that the fact that you are female means more in this game than merely your name – it is germane to the solution of many of the problems

In practice – as far as I got anyway – this tends to mean that a fairly shallow male view of woman's emotions, responses and interests pervades. Angelique is dressed in black leather skirt, black stockings, silk blouse, etc, like a caricature of a French resistance woman – she is also much given to coyness

However, there is much to recommend about the adventure after all, the fact that Angelique comes over with any personality at all even if it is a stereotype is a step up from the usual adventure. Similarly, the solution to many of the problems is deliciously ludicrous – the very first problem of how to get out of the volcano being a case in point

The screen layout is a lesson to others as ever proving that text adventures don't have to look dull, so I recommend it highly. But if you are a woman you may find that you have to grit your teeth a lot.

Program *Angelique*
Price *£6.50*
Micro *Amstrad*
Supplier *Nemesis*
10 Carlow Road
Ringstead
Kettering
Northants
NN14 4DW

DISARMINGLY DAFT

English Software's latest release for the BBC and the Electron is a multi-screen arcade game called *Kissing Kousins* which has the enormous virtue of costing £4.95

Aside from the price there's something about the game that tends to disarm criticism. It's totally silly, features daft bouncing animals and more or less totally consists of jumping over various differently shaped obstacles

It has a some kind of bezerk charm and actually the graphics are very nicely designed. Not a mega game, however

Program *Kissing Kousins*
Price *£4.95*
Micro *BBC*
Supplier *English Software*
1 North Parade
Parsonage
Gardens
Manchester
M60 1BX

CHEERS

World Cup Football on the Spectrum was the first attempt to do anything like Commodore's International Soccer on the machine and clocked up thousands of sales for that reason alone

For obvious reasons Artic have converted the game to the Amstrad which doesn't have colour-res problems and has a sound chip that can make quite a decent crowd-cheering noise

The Amstrad *World Cup Football* is definitely a better program than the Spectrum one but there are some curiosities – for one thing the scrolling is a bit ropey, getting a definite case of the

This Week

Program	*Type*	*Micro*	*Price*	*Supplier*
Heroes of Karn	Ad	Amstrad	£6.90	Interceptor
Morris meets Bikers	Arc	Amstrad	£7.99	Automata
World Cup Football	Arc	Amstrad	£7.95	Artic
Emerald Isle	Ad	BBC	£6.95	Level 9
Combat Lynx	Arc	BBC	£8.95	Durell
Kissin Kousins	Arc	BBC	£4.95	English
Mansion Adventure	Ad	C16	£3.99	Microdeal
Williamsburg Adv	Ad	C16	£3.99	Microdeal
Arena 3000	Arc	C16	£4.99	Microdeal
Cuthbert + Tombs	Arc	C16	£6.99	Microdeal
Shades	Ad	Commodore 64	£6.95	Durell
Velnor's Lair	Ad	Commodore 64	£3.99	Atlantis
Combat Lynx	Arc	Electron	£6.95	Durell
16 Great Games	Arc	Spectrum	£7.50	Infinite
Cavern Attack	Arc	Spectrum	£3.95	5D Software
El Dorado	Arc	Spectrum	£1.99	Atlantis
Electro etc	Arc	Spectrum	£3.95	5D Software
Paintcraze etc	Arc	Spectrum	£3.95	5D Software
Self Destruct	Arc	Spectrum	£2.95	Atlantis
Thermo Nuclear War	Arc	Spectrum	£5.95	Zircon
Wash n Slosh etc	Arc	Spectrum	£3.95	5D Software
Weed Attack	Arc	Spectrum	£3.95	5D Software
Nicotine Nightmare	Arc	Spectrum	£2.99	Atlantis

New Releases

shudders sometimes and the animation of the figures is only fair

Still, it does let you play football passing the ball from player to player, swerving, dribbling and all that. Since it has no rivals on the 464 at the moment I don't really see how it can fail, Brian.

Program *World Cup Football*
Price *£7 95*
Micro *Amstrad*
Supplier *Artic Computing*
Main Street
Brandesburton
Driffield
YO25 8RL

BUG BLASTER

Hypercircuit is the Alligata latest and although only a blast-em-up, it has a few redeeming features such that it's worth a cautious recommendation The idea is that you are patrolling the pcb of your computer moving along the connecting lines of solder – your task is to blast absolutely everything that comes your way in terms of bugs and, as a side issue, find your way around the grid which frequently leads to dead ends.

Simple as the idea is, the actual programming is very professional with very smooth scrolling of the (intricately designed) circuit board and excellent sound effects Later levels really only involve a change of nasties and of colours, so could be it'd get a little tedious after a while but addicts of the pure blast could well enjoy it.

Program *Hypercircuit*
Price *£7 95*
Micro *Commodore 64*
Supplier *Alligata Software*
1 Orange Street

TROPICAL

Until recently whenever one of the major adventure houses produced an adventure intended to run on several machines and featuring graphics you could always be certain that that mighty media star, the BBC B ('take for example this ordinary home micro') would be left out Not enough memory was the cry

But that's all changed with the latest adventure from Level 9 Nor does the adventure itself seem to be any the less involved or sophisticated.

Emerald Isle plonks you into a 'tropical island paradise' where your plane has crashed and you have bailed out, your parachute catching the trees as you fall The first locations, needless to say, feature a maze of trees

The great thing about *Emerald Isle* is the way it gets going almost immediately. There are items, problems and clues from the beginning and a couple of nice (ie, relatively easy to solve but difficult enough to give you that glow of satisfaction when sorted out) problems to fathom out What does the seamstress want? Did you remember to collect it?

Gradually it starts to get fiendish, who or what is the mysterious 'W' and can you *Take* or *Get* it? The answers to these and other questions are likely to fill the pages of Adventure Corner in the months to come. I may write in myself.

Program *Emerald Isle*
Price *£6 95*
Micro *BBC*
Supplier *Level 9*
229 Hughenden Road
High Wycombe
Bucks
HP13 5PG

ARMS TALKS

This is an unusual program – *Worldwise* is an educational program for the Spectrum that aims to teach about the current state of nuclear weapon distribution As an sideline it shows a map of the world, individual countries of which may be displayed, contains details of the posture and numbers of weapons systems in each country, provides the basis for a game of nuclear disarmament and will draw land masses at different degrees of magnification

All the above is accessed via a series of menus based around a database of country shapes – which can simply be used as an atlas – and a database of weapons information

The game works by two players taking charge of the existing weapons balance between east and west and negotiating to drop weapons from the list in return for the other side dropping other weapons from their list at a given position It's a game for teams in the classroom, but I wish I'd been able to play such things at school.

An excellent package that won't be in the shops, but I found fascinating



WORLDWISE: NUCLEAR WEAPONS

Program *Worldwise*
Price *£6.00*
Micro *Spectrum*
Supplier *Richardson Institute for Conflict and Peace Research*
Department of Politics
University of Lancaster
Lancaster LA1 4YF

This Week

Worldwise	Ed	Spectrum	£6 00	Richardson
Racehorse Trainer	S	Spectrum	£5 95	5D Software
Starboard	S	Spectrum	£6 95	Infinite
Character Suite	Ut	Spectrum	£3 99	Infinite
Interactive Bsc Pro	Ut	Spectrum	£8 95	Eugeb
M S W M	Ut	Spectrum	£2.99	Infinite
Mcode sound library	Ut	Spectrum	£3 99	Infinite
Supafile 150	Ut	Spectrum	£4 00	Infinite
Death Race	Arc	Vic 20	£1 99	Antlantis
Super Break Out	Arc	Vic 20	£1.99	Atlantis

Key **Ad** – adventure, **Arc** – arcade, **Ed** – education, **S** – strategy simulation, **Ut** – Utility

DREAMY

Know your own PSI-Q is the claim on the box of Mirrorsoft's latest self-improvement offering. Do you have Psychic Powers? it asks.

I am one of those people, seemingly rare, who never has dreams I can even comprehend, let alone deduce the winner of the Derby from. Similarly, I have never felt eerie forebodings of future disasters nor do I have much luck at dice.

Know your own PSI-Q helps to sort the psychic wunderkinds from the intuitionless clods who don't even know what happened yesterday, never mind next week.

There are two elements to the program, tests and result analysis. The tests come in various types, guessing cards, guessing colours, Psi sub – a sort of clairvoyant battleships and so on. You get your results calculated for each one and a couple of extras – a relaxation section where bleeps are matched to your heartbeat and an opening screen where you are asked a series of questions to determine your psychic mentality, eg. sceptic, enthusiast, etc.

If you're interested in this subject, then this is neatly programmed and quite thorough and removes all the tedious maths involved in assessing the results properly. If you're not interested, then you probably won't have got as far as this sentence.

Program *Know your own Psi-Q*
Price *£9.95*
Micro *Spectrum*
Supplier *Mirror Group, Dunlace House, 4 Canfield Garden, London NW6 3QT*

GREAT GRAPHICS

This must be the third time *Heroes of Karn* has appeared in these pages and for that reason I'll keep this one short. The reason for this program turning up yet again is the fact that not only does it feature awesome graphics by the increasingly legendary Terry Greer, but being on the Amstrad it features awesome Terry Greer *Amstrad* graphics.

So, aside from a good adventure with the usual mystic, dark lords of therg stuff, you get location illustrations that look like they were done with an air brush and outclass almost everything else graphically, with the possible exceptions of *Alien 8* and *Knight Lore*.

If you want a good adventure with graphics to make friends who own other micros gnash their teeth with envy – buy it. It's cheap too.

Program *Heroes of Karn*
Price *£6.00*
Micro *Amstrad*
Supplier *Interceptor Micros, Lindon House, The Green, Tadley, Hampshire*

GOING PLACES

Avalon was one of the most inventive adventure games of last year, mixing distinctive 3D graphics and a number of unique features in terms of the way you interact with the program. Although only joystick commands were really necessary, a large variety of different possibilities were created within the game by the use of a scrolling options chart and the ingenious nature of the problems.

The sequel is called *Dragontorc* and whilst it has all the same features that made *Avalon* the distinctive game it was, there are plenty more things to do, more creatures to meet and, perhaps best of all, more and more varied locations.

Where *Avalon* was set largely in a world of caves and tunnels, *Dragontorc* features woods, stone circles, caverns and buildings. The characters, like all characters in computer games these days, have some sort of artificial intelligence such that their behaviour depends to a large extent on what your character, Maroc, does to them. This has been called many things by many different companies, but Hewson call it Sensory Animation which is as good a phrase as any.

There are 250 different areas to explore and, knowing that journalists are usually too incompetent to thoroughly investigate a complex game, Hewson included a hint sheet which revealed the richness and complexity of even the initial screens. Solving *Dragontorc* is going to need a lot of work.

Program *Dragontorc*
Price *£7.95*
Micro *Spectrum*
Supplier *Hewson, Milton Trad. Est., Milton, Abingdon, Oxon OX14 4RX*

BASIC TRAINING

This is something interesting. An educational program which shows real inventiveness – better still it teaches Sinclair Basic.

Interactive Basic Programming is a tape of more than 200K of text and programs loaded, obviously, in several parts.

If it were merely a book on screen there would be little point in it, but this is quite different. The reason is this: when you load the program and whilst you are using it all the normal Basic functions are available to you!

The advantage of this is that when the text explains, for example, how to use the *Print* command, you can try it whilst the text is on screen and check that you've got it right before moving on.

Program *Interactive Basic Programming*
Price *£9.95*
Micro *Spectrum*
Supplier *Eigen Software, 45 Bancroft Road, Widnes, Cheshire WA8 0LR*

This Week

5D Software Gavin Barker 12 Fleming Field Shotton Colliery County Durham, 0783 261405 **Artic** Main Street brandesburton Driffield &)25 8RL, 0401 43553 **Atlantis** 19 Prebend Street London N1 8PF, 01-226 6703 **Automata** 27 Highland Road Portsmouth Hants PO4 9DA 0705 735242 **Durell** Castle Lodge Castle Green taunton TA1 4AB 0823 54489 **Eigen** 45 Bancroft Road Widnes Cheshire, WA8 0LR 051-423 6201 **English**, Box 43, manchester M60 3Ad 061 835 1358 **Infinite**, 73 Acester Road, Moseley Birmingham 13 **Interceptor**, Interceptor Micro s, Lindon House, The Green, Tadley hampshire 07356 71145 **Level 9** 229 Hughenden Road High Wycombe Bucks HP13 5PG 0494 26871 **Microdeal** 41 Truro Road St Austell Cornwall PL25 5JE 0726 73456 **Richardson**, Instit. Conflict + Peace Rsch, Department of Politylcs University of Lancaster LA1 4YF. 0524 65201 **Zircon** 2 Wendling Rd, Sutton, Surtrey, 641 7102

Masterpieces

Consider the word 'masterpiece'; a word applied to certain paintings, books, pieces of music — but will we ever apply it to computer programs? Of course we sometimes refer to such and such a game as a 'masterpiece' – as a reviewer I'm more guilty than most – but we'd never seriously suggest that *Doomdark's Revenge*, *Kokotoni Wilf* or any other favourite is on a par with the Mona Lisa – would we?

English Literature has more than its share of classics, Chaucer, Shakespeare, Dickens; we never question the quality of their works. They have lasting value, seem to reveal hidden truths about life, move us – and also we've been taught that they're masterpieces since we were kids.

This element of conditioning makes me think that we should look again. Masterpiece – the product of a master, but a master of an art or a master craftsman? We mustn't forget that the above named trio of literary giants wrote primarily to earn their livings, as did most other published writers. There may be genius, but there's more hard graft, time spent learning and practising the craft demonstrated so finely by our literary immortals. Genius is the effective application of craft. Now the idea of a masterpiece program seems less unlikely. After all, computer writing in Basic or machine code, is the manipulation of language, and that succession of binary digits is no more abstract than the musician's crochets and quavers, and to most people the two are equally incomprehensible. Nobody questions musical masterpieces because these dots and squiggles on telegraph wires are transformed into a state which all but the tone deaf understand – sound.

The translator is, of course, the musician, a role the CPU takes in the computer, turning electrical pulses into a form that can be widely understood via a VDU or speaker. That the microprocessor is not subject to the whims of the human performer leads to a more direct transmission of the programmer's craft than the composer's. It's possible to imagine a future classroom in which the disassembly of a 1980's program is studied as closely as a musical score. 'Look how cleverly it jumps here and so speeds sprite movement.'

Of course, increasingly often software is produced by teams of programmers yet we do presuppose just one 'master' because we believe in that rare, *individual* quality called genius. Many still feel unhappy about classing film as 'high art' and have to explain greatness in terms of the talents of one guiding figure, the director. We like to particularise and idolise people who produce masterpieces, merely hyping programmers will not fool people for long, but given great programs the public will discover their 'master' as surely as they did Dickens.

That many programs are written in-house also goes against presupposition. The 'master' is expected to create while starving in a garret before finding a publisher, not produce to order. We happily ignore that the impetus to write is often the need for money. Every masterpiece is part of a commercial system. However, writing teams such as Denton Designs are a move towards apparent autonomy of the author/s, and perhaps software publishers will bid for program rights much as book publishers do for best-sellers.

Despite this analysis I cannot say that I have seen what I would call a software 'masterpiece'. Some demonstrate brilliant craft, but not one has moved or illuminated me. However I'm sure that one will come, because it is society that constructs the myth of the 'masterpiece' and once it has accepted the computer it will feel able to judge its products.

Society it is that makes masterpieces, not the craftsmen and women. Tell Shakespeare that he was writing a masterpiece and he'd probably have laughed into his gin before dashing off another few lines of *Hamlet*.

John Minson

Rate of Growth

Puzzle No 148

Aquarus Variegata is a particularly unusual species of tropical water-lily. It is of particular interest to botanists because of its remarkably constant rate of growth. For example, every day, from 6 am to 6 pm while influenced by the sun it increases in area by exactly 3% in that time, but during the cooler nights (from 6 pm to 6 am) it actually *decreases* 2%.

A large ornamental pond containing one of these remarkable plants was measured and it was found that the surface was exactly half covered by the plant. This was observed at 6 am on the first of July. On what date will the lily have completely covered the pond?

Solution to Puzzle No 143

The simplest method of approach is to test successive values of N in the range 465 – 1000 to determine if the difference between the cube and the square for each value comprises of the nine digits 1-9. As an approximate test, the sums and the products of the digits are taken and the answer printed if these result in totals of 45 and 362880 respectively.

```
10 FOR N=465 TO 1000
20 LET C=N*N*N
30 LET S=N*N
40 LET T=C-S
50 IF T>999999999 THEN STOP
60 LET T$=STR$(T)
70 A=0,P=1
80 FOR F= 1 TO 9
90 LET A=A+VAL(MID$(T$,F,1))
100 LET P=P*VAL(MID$(T$,F,1))
110 NEXT F
120 IF A=45 AND P=362880 THEN PR
    INT N
130 NEXT N
```

This is a particularly useful test and it is much quicker than comparing each digit of the answer to determine if it is different from the other eight digits.

Note that this technique is not infallible but it will screen out most (or in this case, all) of the impossible answers.

Winner of Puzzle 143

The winner is J F Hughes of Hellan, Denbigh, Cywyd, who receives £10

The Hackers





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